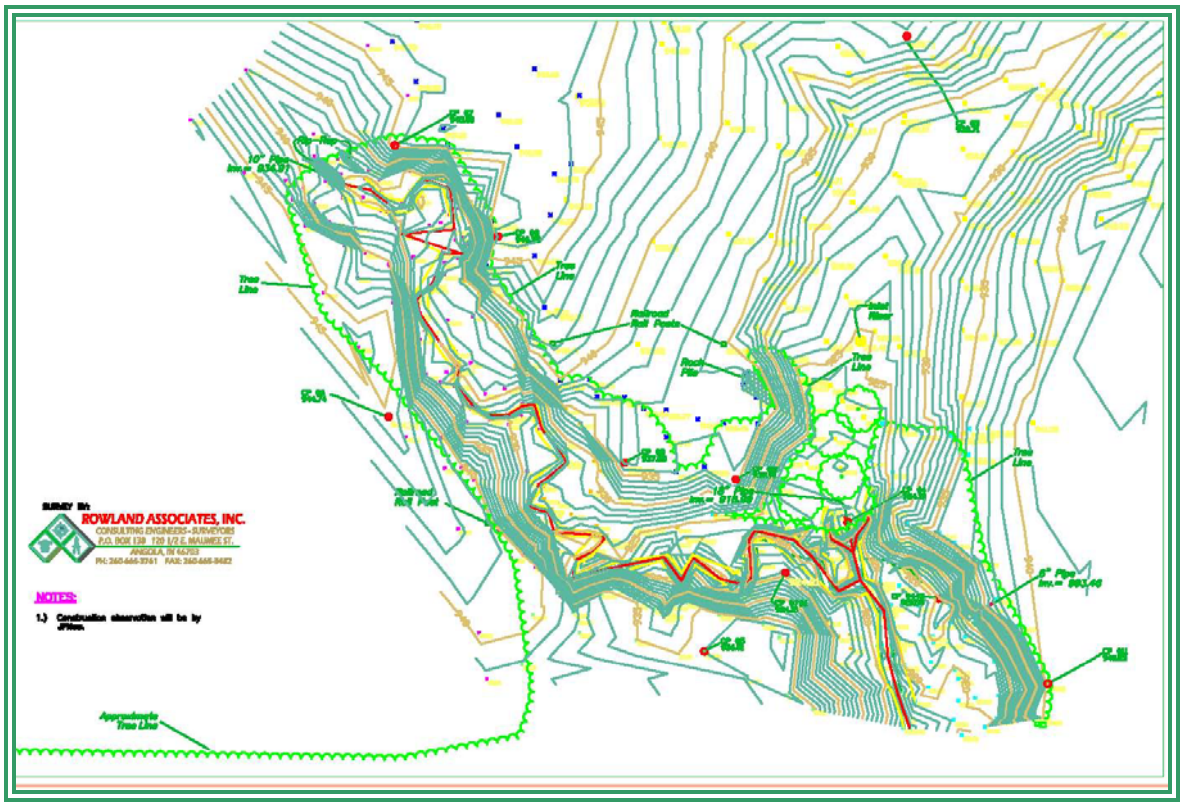
Tri-Lakes Final Report
Henny Property Project
Whitley County, Indiana

November 2007



Prepared for:

Tri-Lakes Property Owners Association
Chair-Environmental Committee
5653 N. 350 E
Columbia City, Indiana 46725

Prepared by:

708 Roosevelt Road
Walkerton, Indiana 46574
574-586-3400

TRI-LAKES FINAL REPORT
HENNY PROPERTY PROJECT
WHITLEY COUNTY, INDIANA

EXECUTIVE SUMMARY

The Tri-Lakes Property Owners Association is addressing erosion issues within their watershed. One of the projects identified by the association was an eroding stream into Little Cedar Lake. The association contracted with JFNew to complete a design project that would address the erosion issue from this stream. Discussions with the landowner, Natural Resource Conservation Staff, and association members resulted in a designed pond, rock chute, and rock check dams within the existing drainage. The pond is designed in the western sub-watershed of the Thomas Henny Farm to be 1.1 acres and has a maximum depth of 25 feet. The rock chute is designed at the outlet of the designed pond and at the outlet of an 18-inch drainage tile within the eastern sub-watershed of the Thomas Henny Farm. Two check dams are located in the stream between the rock chute and Little Cedar Lake. The project is designed to reduce stormwater runoff-velocity and reduce downstream gradients in order to minimize future erosion from this drainage.

ACKNOWLEDGEMENTS

This project was funded by the Indiana Department of Natural Resources (IDNR) - Division of Fish and Wildlife, Lake and River Enhancement Program with matching funds provided by the Tri-Lakes Property Owners Association. JFNew recognizes the following individuals who assisted with the design: Wayne Stanger, Andrew Bender, Garth Hughes, Max Evans, Todd Nichols, and Brian Majka. Thomas Henny, who provided uninhibited access to the property for design and Construction work and contributed information used in the design process, owns the property. Rowland Associates, Inc. of Angola, Indiana completed the survey work. John Richardson authored this report.

TRI-LAKES FINAL REPORT
HENNY PROPERTY PROJECT
WHITLEY COUNTY, INDIANA

TABLE OF CONTENTS

TABLE OF APPENDICES

TRI-LAKES FINAL REPORT
HENNY PROPERTY PROJECT
WHITLEY COUNTY, INDIANA

1.0 PROJECT DESCRIPTION AND PURPOSE

The Tri-Lakes are a chain of lakes consisting of Cedar, Little Cedar, Round, and Shriner lakes located in Whitley County, Indiana (Figure 1). The smallest lake in the chain is Little Cedar Lake at approximately 45 acres; however, Little Cedar Lake has the largest sub-watershed of the lake chain. This sub-watershed is dominated by highly erodible land which drains to the lake via two small drainages (Figure 2). One landowner owns the majority of land draining to Little Cedar Lake from the north. This land is in active agricultural production. While erosion control practices(grass waterway in each drainage) have been implemented in the agricultural field, erosion downstream of the grassed waterways continues to occur due to increased runoff volumes and velocities (Figures 3 and 4). This purpose of this project was to design structures that would reduce runoff volume and velocity and subsequent erosion of stream bank sediments into Little Cedar Lake. After many discussions and proposed solutions, the designs focused on creating a permanent pond by building a dam in one of the two valleys, constructing a rock chute at the outlet of another valley, and installing rock check dams downstream of both valleys.

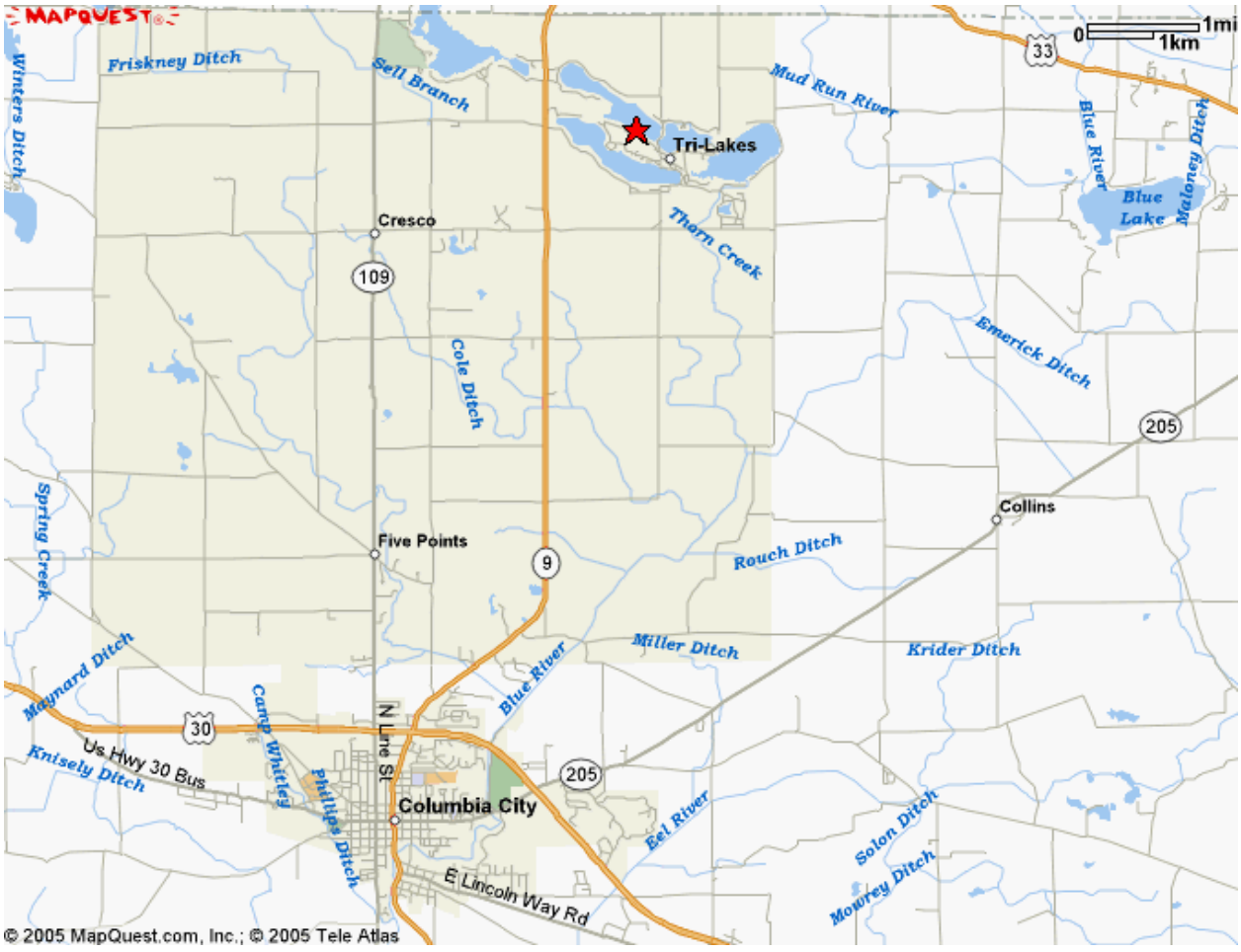


Figure 1: Location of the Tri-Lakes (Cedar, Round, and Shriner) in Whitley County, Indiana

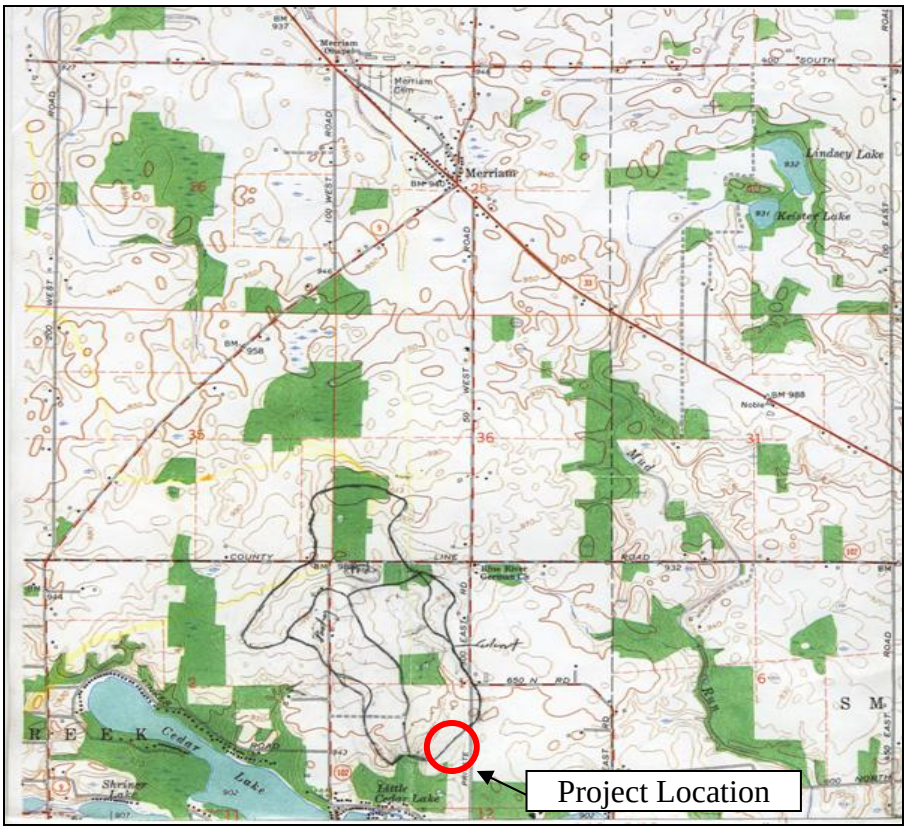


Figure 2. Approximate location and watershed boundaries of the Little Cedar Lake erosion control project.

Figure 3 and 4. View of drainage tile outlet from grassed waterway and downstream drainage north of Little Cedar Lake.

2.0 DESIGN RATIONALE

Initially, the project was conceived as a series of water and sediment control basins (WASCOBs) within the drainages leading to Little Cedar Lake. However, after calculating the runoff from the 184-acre watershed, it was determined that a WASCOB structure would not withstand the volume and velocity of water (176 cfs) flowing through both drainages after a 5-year, 24 hour storm (Appendix A). Based on input from the landowner, a decision was made early on in the project to construct one or more ponds that could retain the runoff from each of the two sub-watersheds to reduce peak discharge volumes, water velocities, and erosion potential downstream of the existing grass waterways.

The natural topography of the two existing drainages meeting in a well-defined valley allowed consideration of one or two dams. At the considered dam elevation of 934 msl located at the lower end of each ravine, the west pond would obtain surface water runoff from 64-acres and create a 1.1-acre pond (58:1 ratio). At this same elevation the proposed pond in the east valley would obtain surface water from 104 acres and cover approximately 2.3 acres (45:1 ratio). These watershed surface area to pond area ratios are considered extremely high and result in very little storage potential during storm events. Calculations indicate a 5-year, 24-hour storm fills the entirety of each basin with 6.3 acre-feet of runoff from the western sub-watershed and 9.6 acre-feet of runoff from the east sub-watershed. Calculations are based on a runoff volume of 1.56 inches per acre during the 5-year, 24-hour storm. Based on these calculations, it was determined that even dry-bottom basins would not result in appreciable storage during a 100-year storm event. Additionally, the landowner was not in favor of dry bottom basins.

A major source of sediment loading to the lake was being generated from in-stream bank erosion rather than from the surrounding watershed. The concentration of flow generated from the upstream grassed waterways and drainage tiles accelerated downstream bank erosion. Eroded stream banks were noted within the forested western valley and began at the outlet of the six-inch drain tile, which carried water from the grassed waterway. While the east valley exhibited little erosion along the defined grass waterway, areas downstream of the 18-inch tile outlet from the waterway had vertically cut banks measuring 1.5 to 3.5 feet high. The silt-loam soils within this drainage are rated for velocities of 4 feet per second (fps), while the calculated velocity during a 5-year 24-hour storm is in excess of 6 fps.

To address the in-stream erosion and satisfy the landowner, a decision was made to construct a pond in the west basin, which possessed the appropriate sub-surface conditions for a dam. A rock chute was designed to stabilize the soils at the outlet of the tile from the eastern drainage. Additionally, it was decided to control erosion downstream of the pond and rock chute by reducing the gradient from 1 percent to 0.5 percent with rock check dams. The combination of the pond, rock chute, and the check dams are predicted to reduce in-channel velocities from the existing 6 fps to 3.4 fps. The velocity reduction comes by increasing the access to the floodplain during storms of lesser magnitude. As the water reaches bank full and spreads into the floodplain at lower peak discharges the energy of the water (measured as in-stream velocity) decreases. Reduced velocity within the channel should reduce erosion of the channel banks.

3.0 DESIGN AND CONSTRUCTION SPECIFICS

The following paragraphs describe the work performed for each portion of this project. Notes and calculations supporting the design criteria are in Appendix A. The plans contain additional details (Appendix B). Construction documentation is contained in (Appendix C). Appendix D contains the Permit Notification requirements.

3.1 Pond

The purpose of the pond is to intercept upstream sediment, eliminate the existing gully erosion within the area of the project, mediate peak flow volumes, and reduce downstream water velocities. The pond is approximately 1.1 acres at normal pool. The principle outfall of the pond is a 48-inch diameter riser pipe with a rim elevation of 932.7 msl leading to an 80-foot long, 30-inch diameter horizontal pipe with an invert of 925.7 on the west end (Appendix B). The riser pipe, with the collar of the horizontal pipe attached, is embedded in approximately 4 yards of concrete both inside and outside of the bottom of the pipe. The pipe material was changed from the specified metal (CMP) to an HDPE dual wall plastic pipe with flared collars and rubber seals. The riser was custom made with a plastic weld to support the 30-inch horizontal section 1-foot above the bottom of the riser. Additionally the baffle was changed to a wooden 12-inch board supported by free standing posts instead of posts bolted to the riser with an attached corrugated metal baffle as shown on the plans. A hog wire fence grate (6-inch openings) was added underneath the baffle for safety reasons as the landowner feared that their children may fall into the riser. This change came with the understanding by the landowner that they will be responsible for cleaning the grate of debris after or possibly during storm events as the original design was meant to pass this debris through the structure.

The invert of the outfall at the east end into the existing stream is 918 msl. This is a change from the original design plans which showed the invert at 919 but truncated in a riprap splash pool 20 feet from the existing stream. The grade of the pipe through the levee remains at approximately one percent. Riprap at the outfall is 18 inches thick with a D-50 of 9 inches to handle the expected 60 cubic feet per second (cfs) discharge after a 5-year, 24-hour storm event. The emergency spillway is 25 feet wide to handle the 25-year, 24-hour storm event and has a designed crest elevation of 934.0 msl allowing 1.3 feet of potential storage. The original spillway location was moved to avoid the removal of an existing stand of timber. The outlet to the spillway from the pond is the same location and elevation shown on the plans, however, the path was routed north into the existing grassed waterway in the eastern drainage. The design elevation for the top of the dam is at 936.0 msl. The designed construction height of the dam is at 937.5 msl to allow for future settling of the dam. The exposed surfaces of the dam and spillway were seeded with a mixture of cool and warm season grasses. The shelf containing the inlet drop structure was seeded with a wetland grass and forb mixture as per the plans. The remainder of the disturbed areas around the pond was seeded with cool season grasses. These seeded areas should be maintained by the property owner with annual mowing or burning.

The pond was designed with a maximum depth at normal pool of 14 feet near the dam after excavation of approximately 3200 cubic yards for construction of the dam. However, the use of more material then planned resulted in a maximum depth of 24 feet near the base of the dam. The dam has an eight-foot wide core trench cut two feet into the existing grade. The earth used

in the dam came from excavation at the bottom of the pond and was compacted in six-inch soil lifts to a minimum 94 percent proctor (tested every other lift) until the design grades were reached. Installation of the outfall pipe occurred during dam construction with compaction around the pipe structures completed by the use of a jumping jack compactor with a 6 x 12 inch footprint. The three anti-seep collars shown on the plans were eliminated from the plan set by a reviewing engineer prior to construction. In place of the proposed anti-seep collars, the soil was compacted using the jumping jack around the pipe until a point east of the core trench at which point the horizontal pipe was bedded and surrounded in coarse sand to the outlet. Additionally, a vertical filter of sand was constructed over the top of the pipe in a column rising from the beginning of the sand underlayment and extending to within two feet of the final dam surface. This filter is meant to capture any seepage that permeates the core and direct this water along and under the outfall pipe. The end of this sand seepage vein at the culvert outlet into the stream is covered with riprap. The dam is to be maintained free of trees and shrubs by the owner.

3.2 Rock Chute

The purpose of the rock chute is to protect the existing 18-inch tile outlet, eliminate erosion from the existing tile discharge, and eliminate erosion from overland flow and the emergency spillway into the channel. The rock chute was designed to handle a maximum flow of 118 cfs and a maximum velocity of 8.4 fps. The riprap is 18-inches deep with a D-50 of nine inches. The length of the chute is 40 feet with an entrance width of 20 feet and an exit width of 14 feet. Both the primary outfall and the spillway from the pond empty into the rock chute. A non-woven, non-heat bonded, eight ounce per square yard filter fabric was placed under the rock below the 18-inch and 30-inch outfall pipes to reduce scour of the original surface.

3.3 Rock Check Dams

The purpose of the check dams is to reduce the slope of the stream and reduce in-channel velocities, and thus reduce erosion during storm events. A series of five check dam structures were proposed along the stream between Tom Henny's property and East Stalf Road on the north side of Little Cedar Lake. After attempting to negotiate property access for six months with the downstream owner, three check dam locations were eliminated due too the lack of an access agreement. The section of stream that was not treated was the most severely eroded section with multiple head cuts working upstream. The most downstream structure installed on Tom Henny's property should serve to stop incision upstream, however, additional erosion will occur in the lower reach until the channel reaches a new equilibrium (develops a new floodplain) at its current elevation. If the downstream landowner allows access in the future, it may be prudent to install the additional three check dams at the proposed locations.

The two installed check dam structures consist of a rock key trench across the defined stream channel. The key trench was excavated two feet below the stream grade and a minimum of four feet into the embankments of the stream. The rock used to fill the key trench had a D-50 of nine inches in diameter. The center of the channel (thalweg) within the check dam was constructed 16-18 inches below the channel embankments and sloped upward to meet embankment grades. Additional rock of the same size as the key trench was added to approximate a 3:1 upstream slope and a 7:1 downstream slope. Locations of check dams were field staked so that the dam at the south property line backed a pool up to the dam approximately 200 feet upstream with minimal disturbance to live trees.

3.4 Landowner Agreements

Signed landowner agreements with the affected property owner are held on file at JFNew's corporate office in Walkerton, Indiana and with the Tri-Lakes Property Owners Association.

3.5 Permitting

The project was determined to not require an IDNR Construction in a Floodway Permit due to the fact that it had less then 1 square mile of drainage. Permits were required from the Indiana Department of Environmental Management (IDEM) and the US Army Corps of Engineers (ACOE) for this project. The project qualified for existing Regional General Permit (RGP) due to the minimal amount of fill placed below the OHWM (less than 25 cubic yards and less then 1/10 acre of impact over all). A notice was submitted to IDEM and the Corps regarding the impending construction and no response was received, which, according to regulations allows the project to precede under the RGP guidelines. A copy of the Notice and proof of mailing is in Appendix D.

4.0 CONSTRUCTION COSTS

Table 1: Probable estimates of costs prior to actual construction

ITEM	Unit	Number of Units	Unit Cost	Total Cost
Mobilization/Demobilization	Each	1	2,000	2000
Clearing and Grubbing	Each	1	4,000	4,000
Earth Moving (includes core trench)	CubicYard	3350	4.50	15,075
Rock	Ton	400	30.00	12,000
Pond Outlet Structure	Each	1	2,500	2,500
Seed	Acre	1	1,500	1,000
Operator/Backhoe (check dams)	hours	40	100	4,000
Labor (seed and outlet structure)	hours	40	40	1,600
Subtotal				**$42,175**
Engineering oversight	hours	40	100	4,000
TOTAL				**$46,175**

The actual cost of the construction was $38,400. This contractor fee included a deduction of $6,000 from the original bid due to the elimination of three check dams (check dams were bid as individual units at $2,000 each). Construction administration (including finalizing the landowner agreement) and construction supervision was bid at $6,000 by JFNew but later increased to a total of $11,000 to account for the additional time spent on site. The supervision contract had called for three inspections but was increased to full-time supervision for the majority of the work to ensure that the specifications were followed. The total project cost was therefore, $49,400.

5.0 MONITORING AND MAINTENANCE ACTIVITY

The property owner will be responsible for annual maintenance and monitoring as spelled out in the legal agreement. Significant repairs will be the responsibility of the Tri-Lakes Association for the term of the agreement (20 years).

The dam will require maintenance mowing or burning of vegetation on an annual basis. Trees should not be allowed on the dam as their root structure can severely damage the structure if the tree is blown over and the root mass upended. The owner should annually inspect the dam for potential muskrat damage. After major storm events, the outlet of the pond should be examined and cleared of any debris that might clog the pipe. If the primary outfall does clog and the emergency spillway is used, the owner should check for and repair any rill or gully erosion damage that might occur with earthen fill and a similar seed mix. Muskrat damage should be repaired using compacted clay fill. Rock protection can be installed along the face of the dam if muskrat damage becomes a recurring problem.

Annual inspection of the rock chute and rock check dams are necessary to insure that water does not erode around these structures and that the majority of rocks are still in place and not washed downstream. If significant damage to any of the structures occurs, the inspector should notify the landowner, the lake Association, LARE staff, or the design firm. Repair to any erosion occurring around the structures should be made as soon as possible or within several weeks after noticing the problem.

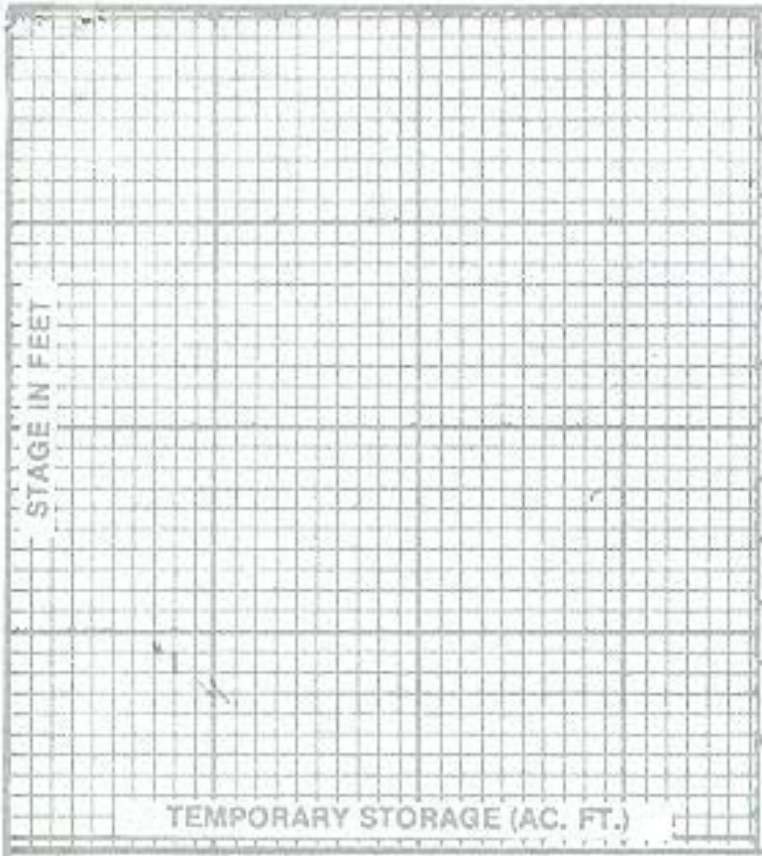
6.0 PROJECT SUMMARY

The Tri-Lakes Property Owners Association is addressing erosion issues within their watershed. One of the projects identified by the association was an eroding stream into Little Cedar Lake. The association contracted JFNew to complete a design project that would address the erosion issue. Discussions with the landowner, Natural Resource Conservation Staff, and association members resulted in the design of a 1.1-acre pond, rock chute, and five rock check dams within the existing drainage on the Thomas Henny Farm. Three of the check dams were located on another owners' property and were subsequently eliminated from the project due to a lack of an agreement with the landowner. The project was designed to eliminate erosion from the upper end of the drainage while reducing downstream gradients and velocities in order to prevent future erosion. The proposed project was funded in 2005 with a construction grant from LARE and was construction in August and September 2007.

TRI-LAKES FINAL REPORT
HENNY PROPERTY PROJECT
WHITLEY COUNTY, INDIANA

APPENDIX A

DESIGN NOTES AND CALCULATIONS



AVAILABLE STORAGE

Elevation	Area Sq.in.	Area Flooded Acres	Average Acres	Interval Ft.	Interval Storage Ac. Ft.	Accum. Storage Ac. Ft.
934	29.9	1.1				0
933	26.4	1.0	1.05	1	1.05	1.05
932	23.4	0.9	0.95	1	0.95	2.0
931	20.2	0.7	0.80	1	0.80	2.8
930	17.6	0.6	0.65	1	0.65	3.45
928	12.8	0.5	0.55	2	1.1	4.55
926	10.3	0.4	0.45	2	0.9	5.45
924	6.6	0.2	0.3	2	0.6	6.05
922	3.2	0.1	0.15	2	0.3	6.35

STAGE - STORAGE CURVE DATA

EARTHWORK COMPUTATIONS 12' Top 3:1 - 3:1

Station	Elevation	Fill Height FT.	Cu.yd. per ft.	Average fill cu.yd.	Distance ft.	Fill cu.yd.
0+00	936.0	0	0			
0+40	926.0	10.0	15.5	7.75	40	310
0+60	924.0	12.0	21.3	18.4	20	368
0+74	921.0	15.0	31.7	24.5	14	371
1+58	936.0	0	0	15.85	84	1331
						2380
				20% Settlement		476
						2856

CONSTRUCTION CHECK

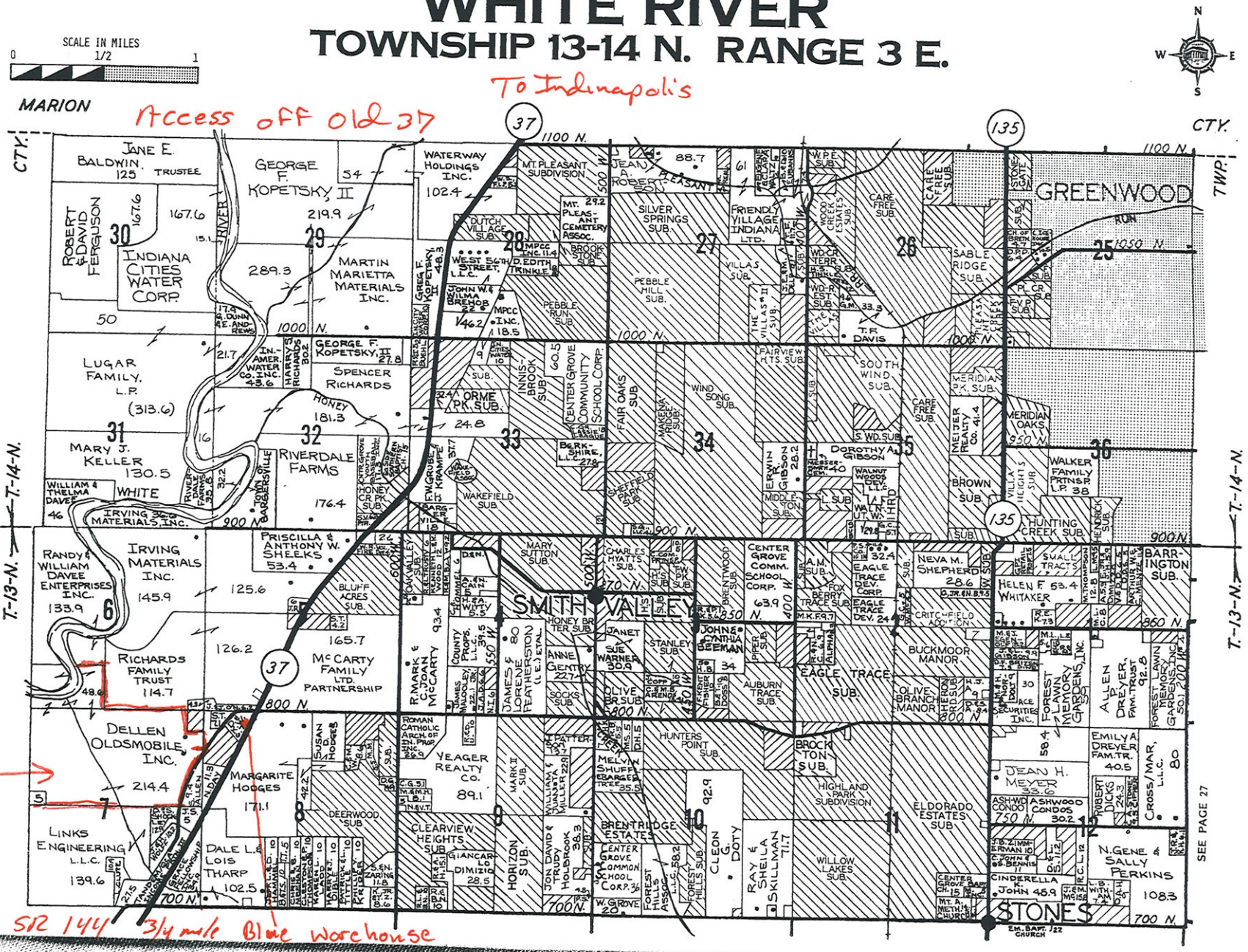
Length of fill _____ ft.
Top width _____ ft.
Side slopes _____
Pipe diameter _____ In.
Stage (emerg.-prin.) _____ ft.
Top fill — emerg. el. = _____ ft.
Veg. spwy. width _____ ft.
Top fill el. _____
Veg. spwy. el. _____
Prin. spwy. inlet crest el. _____
Prin. spwy. outlet invert el. _____

Clearing adequate (yes) (no) _____ Core trench adequate (yes) (no) _____
Stockwater system adequate (yes) (no) _____ Fencing adequate (yes) (no) _____
Seeding adequate (yes) (no) _____ Pipe installation adequate (yes) (no) _____

I certify that this job meets all the requirements of Indiana Standards and Specifications for Pond (Code 378) and the plans as designed.

Checked by: _____ Date: _____

WHITE RIVER
TOWNSHIP 13-14 N. RANGE 3 E.



CIVIL ENGINEERING CONSULTANTS
A PROFESSIONAL CORPORATION
CECon

May 24, 2006

Mark Pranckus
JFNew
708 Roosevelt Road
Walkerton, Indiana 46574

As you requested, we have reviewed the Tri-Lakes Design Report as prepared by JFNew, December 2005. Following are the comments and concerns we have generated. They are in no specific order, except that they generally follow the progression of the report.

1. The ratio of watershed to pond surface area is 58:1. A ratio this high will likely result in high maintenance costs due to flood damages.
2. The owner will want to budget for silt removal. There will certainly be a large amount of silt from the cropland and channel erosion upstream. This impoundment will function as a large in-channel sediment trap.
3. Specification section 3.1 states a minimum compaction standard of 95% standard proctor. There is no mention of a testing agency to monitor compaction. That should be included whether supplied by the owner or the contractor.
4. Spec sections 3.1 and 3.3 include two-foot wide core trenches. There are no soil boring reports to suggest this is an adequate depth. If the soils are sandy, for instance, it probably is not. You might incorporate a soils investigation and core trench recommendation with the cost of compaction testing.
5. Three different sizes of riprap are specified for the project. It may be more economical to determine the sizes available locally and specify the applicable one. Riprap is commonly specified by "D_{50}", which means 50% by weight is larger or smaller than the named size, i.e. D_{50}=9".
6. We are concerned about the effectiveness of the rock check dams as designed. Realize, we have not seen the site. According to the profile, there is considerable drop between the dams. Dam drops will cause velocity increases, which will increase velocities between the checks. Increased erosion will quickly fill the checks, canceling their detention ability. Perhaps consider adding plunge pools at the base of each check dam to dissipate energy there.
7. Design Notes, page 10, item 2 and Wayne Stanger worksheets, page 12, Design Data, Hazard Classification both note two homes that could be affected if a failure should occur. Even though this dam does not meet minimum IDNR criteria, it still could be considered "High Hazard". If a person downstream files complaint and investigation shows due concern, the dam's hazard classification can be set. During the investigation a

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costly hydrologic and hydraulic study with breach routings will likely be required. The dam owner would likely bear the cost of the investigation, $10,000 to $15,000.

8. NRCS has not been using anti-seep collars for several years mainly because of the problems installing them. Compaction is a critical issue. This dam has relatively low static head behind it, so failure is less likely. However, most state and federal agencies recommend no anti-seep collars. Instead they use a vertical filter layer, which intercepts water and drops it to a foundation drain below.
9. A toe drain is not included in the design. Toe drains are intended to intercept flow through the embankment fill so that it does not exit at the surface and create an unstable condition. When installed in connection with an aggregate filter, mentioned above, soil particles are retained and water is allowed to pass. This maintains the stability of the embankment long-term.
10. Page 2 of the outlet structure design shows the trash rack and baffle plate eliminated. Removing the baffle plate will allow a vortex, which will greatly reduce the capacity of the riser as it was calculated in the design notes.
11. A draw down structure is not included in the design. This is certainly not required. Considering the quantity of silt expected, however, it would be nice to be able to lower the pool. This could be done occasionally for silt removal.
12. Outlet pipe capacity review:

    30" helical metal pipe, 70 feet long, 13.5 feet head

    Capacity 77 cfs, per Engineering Field Manual, Figure 6-26.1

    48" riser, 1.3 feet head

    Capacity 57 cfs, per Engineering Field Manual, Figure 6-27

    Comments: The weir length controls the capacity of the structure. Full pipe flow will not be obtained. Consider raising the embankment to create additional head, or increasing the riser size to reach outlet conduit capacity.
13. Flood routing calculations appear to be correct. Again, the high ratio of watershed to pond area and storage capacity is of concern. This structure appears ineffective to control expected cycles of storm events. For example, a 5-year storm event will produce a peak runoff of 57 cfs. The outlet capacity at that calculated head is 45 cfs.

Clearly, much of the rationale behind the design of this structure is driven by the desires of the owner. That is a dangerous concept if the owner doesn't understand the ramifications of his desires. The potential problems and liabilities of this structure, as designed, should be clearly communicated to the owner to protect JFNew as best possible.

If you have any questions or need additional review please do not hesitate to call.

Sincerely,

Garth T Hughes, PE

csr

JFNew
From Native Seed to Ecological Solutions

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COPY

July 6, 2006

Lou Wuellner
Tri-Lakes POA President
1900 E. Linker Road
Columbia City, IN 46725

Thomas M. and Julie Henney
4119 N 350 East
Columbia City, IN 46725

Re: Henny Landowner Agreement
Tri-lakes Sediment Control Project

Dear Lou and Tom,

Enclosed please find three copies of the revised agreement we discussed several weeks ago. By copy of this letter I am also providing an additional copy to Tom Henney. One of your copies and Tom's copy has the changes highlighted for your review. Please notify me by the end of July if either of you disagree with the changes shown.

This letter will also serve as the official amendments to the Design Report plans that we discussed. The following changes will be required by the contractors:

1) The riser pipe shall be 48 inches in diameter and shall include a baffle plate and shown in the specifications.
2) All stone utilized in project shall have a D50 of nine (9) inches
3) During construction the dam will be tested with a penetrometer by a third party engineer for a minimum of every 1200 square feet of six-inch soil lift with no less than three tests per lift.
4) Anti-seep collars will not be used as per the current plans; however we will require the contractor to add a vertical filter layer and a toe-of-slope drain.
5) The owner will be responsible all annual maintenance of the dam, rock chute, and pond including silt removal should that become necessary.
6) The Tri Lakes POA will be responsible for necessary repairs to the structure and any government required inspections or studies.

Mr. Wuellner will sign two original agreements with a witness and then send them to the Hennys for their signature with a witness. Tom, please return one copy back to Lou and Lou, please make a copy of the signed agreement for JFNew and record the original at the County Recorders office.

Please contact me if you have any questions.

Sincerely,

John Richardson
Senior Project Manager

Encl: copies of agreement

cc: Todd Nichols
Kent Tracey
JFNew file 03-01-23

MEMORANDUM

TO: Prospective bidders

From: Mark Pranckus, Project Manager JFNew

RE: Tri Lakes POA- Thomas Henny Project Bid Addendum #1

Issue Date: July 7, 2006

1) The riser pipe shall be 48 inches in diameter and shall include a baffle plate and shown in the specifications.

2) All stone utilized in project shall have a D50 of nine (9) inches

3) During construction the dam shall be tested with a penetrometer by a third party engineer for a minimum of every 1200 square feet of six-inch soil lift with no less than three tests per lift. The contractor is responsible to obtain and pay for these testing services and supply the test results to JFNew, the property owner, or the Tri-Lakes POA representative as requested.

4) Anti-seep collars will not be used as per the Design Documents; however the contractor shall add a vertical filter layer and a toe-of-slope drain as shown on Attachment A.

5) The contractor shall carry a minimum of one million dollars per occurance in liability insurance and name the landowner as an additional insured on their policy. Proof of this insurance must be submitted prior to contract signing.

5) The base bid will be for the dam and the rock chute combined.

6) The alternate bid will be for additional rock check dams to be installed downstream on as per the plans. Consider each check dam as a unit price.

MEMORANDUM

TO: Prospective bidders, Kent Tracey, Tri-Lakes POA

From: John Richardson, JFNew

RE: Tri Lakes POA- Thomas Henny Project Bid Addendum #2

Issue Date: August 2, 2006

1. John Richardson from JFNew will meet with the selected contractor to stake out the project during a pre-construction meeting.

2. John Richardson from JFNew will be available to answer questions, inspect the progress of work, as well as approve progress payments on behalf of the Tri-Lakes Property Owners.

3. Access for contractors shall be the route taken during the pre-bid meeting, east of the barn and residence.

4. All trees and brushed cleared from the dam and pond location shall be hauled away or burned on site. Portions of stumps and tree trunks unable to be burned may be buried in the bottom or sides of the pond for habitat under the direction of the owner. The Contractor is responsible for burn permits.

5. Rule 5 is not applicable to this project as the site grading shall be less than 1-acre. However: it is the contractors' responsibility to maintain erosion control during construction so that measurable soil erosion from the site and sedimentation in the lake downstream does not occur during the project.

6. The soil type is Morley silt loam with possible Pewamo silt loam inclusions within the valley where the dam is planned. There is adequate clay loam in the dam site within 4-feet of the surface for construction the dam.

7. A yardage estimate of 2850 CY was shown in the plan documents but that figure may not be correct. The responsibility for figuring the actual yards of earth to be moved are the bidder/contractors responsibility. Additional payments for earthwork in excess of the estimated yardage will not be made.

8. The change made in the dam design includes a vertical drain and a toe-of-slope drain in place of the three anti-seep collars. The vertical sand drain shall be constructed on the down slope side of the dam approximately 15-feet east of top of the dam, be three (3) feet in thickness, be five (5) feet wide, and extend vertically to within two (2) feet of the surface of the dam. The 30-inch horizontal pipe shall be embedded in sand from the vertical drain east to the outlet. The outlet of the horizontal drain shall be covered in rock as shown in the drawings.

9. The 48-inch riser pipe shall have a two (2') foot stub to connect the 30-inch horizontal pipe to, but shall not have a stub facing the pond.

10. The 30-inch pipe shall have welded flange couplings as shown in the details.

11. There shall be a flared end on 30" pipe terminating at a rock pool/splash pad that is three feet deep and 10-feet in diameter. The three-foot pool depth is at the same elevation at the bottom of the rock chute and therefore the pool shall blend into the rock chute.

12. The stationing for the check dam locations begins at the end of the rock chute. Check dams shall be field located with JFNew prior to construction.

13. All disturbed soils outside of the proposed pond shall be seeded with the same seed mixture being applied to the dam. No estimates of potential disturbed areas are provided.

14. The check dams will be no longer than 25 feet in length and no taller than 1.5 feet above the existing stream grade. Keep in mind that the core trench on the check dams is three (3) feet thick and two (2) feet below grade.

15. All check dam location cross sections are not identical. They vary from 11 to 13 feet across and from 1.8 to 3.5 feet in depth. Add 8 feet to this width for calculations as the core trench must be keyed into each embankment by 4 feet.

16. All stone used on the project shall have a D-50 of nine (9) inches and have a minimum thickness of 18-inches when placed.

17. Fill in rip rap voids with smaller stone or gravel found on site.

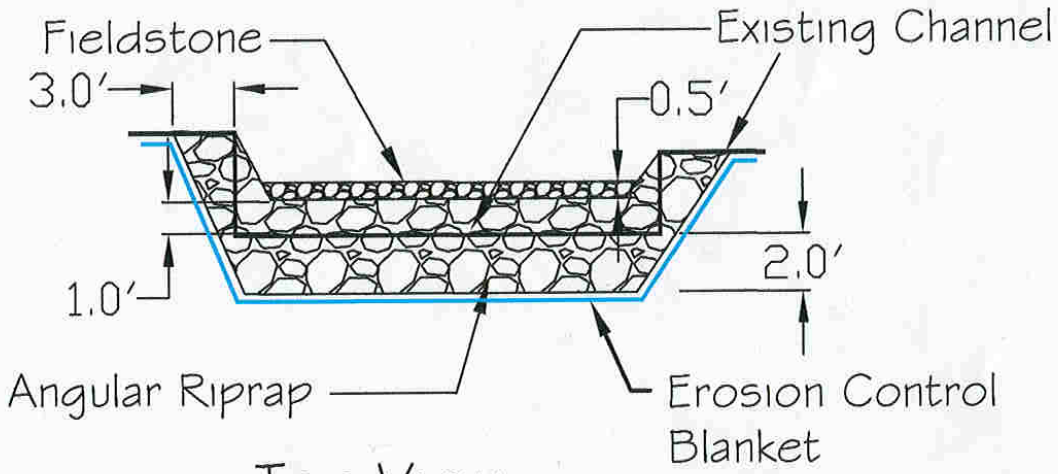
18. A levee is shown on the plan view extending from the rock chute directly to the base of the dam with its own small spillway. The levee shall have a minimum width of eight feet constructed to the elevation shown with each side sloped at 3:1 to meet the existing grade. The levee and spillway for this small levee shall be seeded with the slope stabilization mix. The spillway shall be protected with the turf-reinforcement erosion control mat as specified for the main spillway.

19. Third party compaction testing will be necessary. Please identify your subcontractor for this work in your bid documents.

20. Once the contract is let it is expected that the work will be completed in a timely manner during 2006. If the work has not begun by November 2006 the Tri-Lakes Association reserves the right to nullify your contract and select another contractor.

Economy Prairie Seed Mix

Botanical Name	Common Name		PLS Ounces/Acre
Permanent Grasses:			
Andropogon gerardii	Big Blue Stem		12.00
Andropogon scoparius	Little Blue Stem		24.00
Bouteloua curtipendula	Side Oats Grama		18.00
Elymus canadensis	Prairie Wild Rye		16.00
Panicum virgatum	Prairie Switch Grass		1.50
Sorghastrum nutans	Indian Grass		10.00
		Total	81.50
Temporary Cover:			
Avena sativa	Seed Oats		360.00
Lolium multiflorum	Annual Rye		100.00
Phleum pratense	Timothy		20.00
		Total	480.00
Forbs:			
Asclepias tuberosa	Butterfly weed		1.25
Aster novae-angliae	New England Aster		0.75
Cassia fasciculata	Partridge Pea		3.00
Coreopsis lanceolata	Sand coreopsis		3.00
Echinacea purpurea	Purple coneflower		3.00
Heliopsis helianthoides	False Sunflower		0.25
Liatris aspera	Rough Blazing Star		1.50
Lupinus perennis	Wild Lupine		3.00
Ratibida pinnata	Yellow Coneflower		2.50
Rudbeckia hirta	Black-Eyed Susan		2.00
		Total	20.25



Notes:

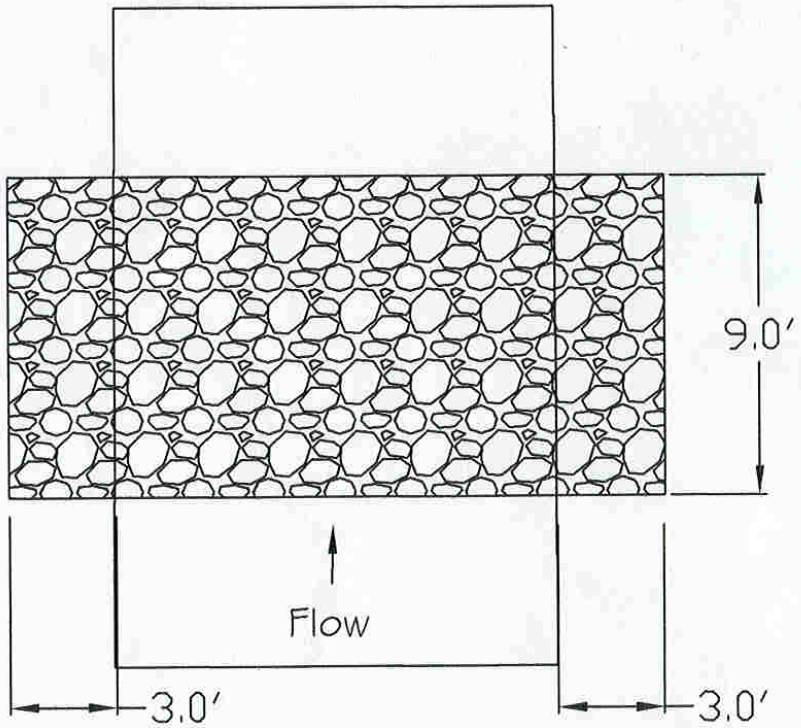
1. Angular riprap will be keyed 3' into each bank and 2' into the bed.

2. Fieldstone used for the cap will have a minimum diameter of 6".

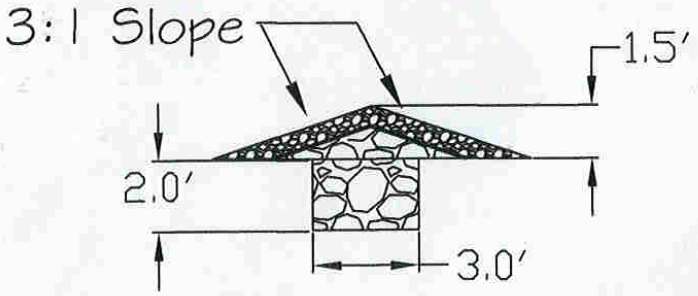
3. The final slope of the upstream and downstream faces will be 3:1.

4. Erosion control blanket shall be placed in the bottom of the key trench prior to riprap placement.

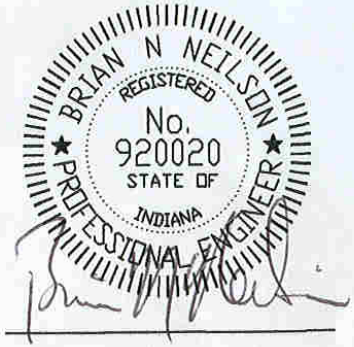
Top View



Side View



Typical Check Dam Design



JFNew
708 Roosevelt Road, Walkerton, IN 46574
(574) 586-3400/ Fax (574) 586-3446
www.jfnew.com

CROOKED CREEK

CROOKED LAKE ASSOCIATION, INC

T32N, R9E, SECTION 3
THORNCREEK TOWNSHIP
WHITLEY COUNTY, INDIANA

SCALE: NOT TO SCALE
DATE: 7/29/04
FILE: 94-01-12
CHECK DAM DETAILS

JFNew

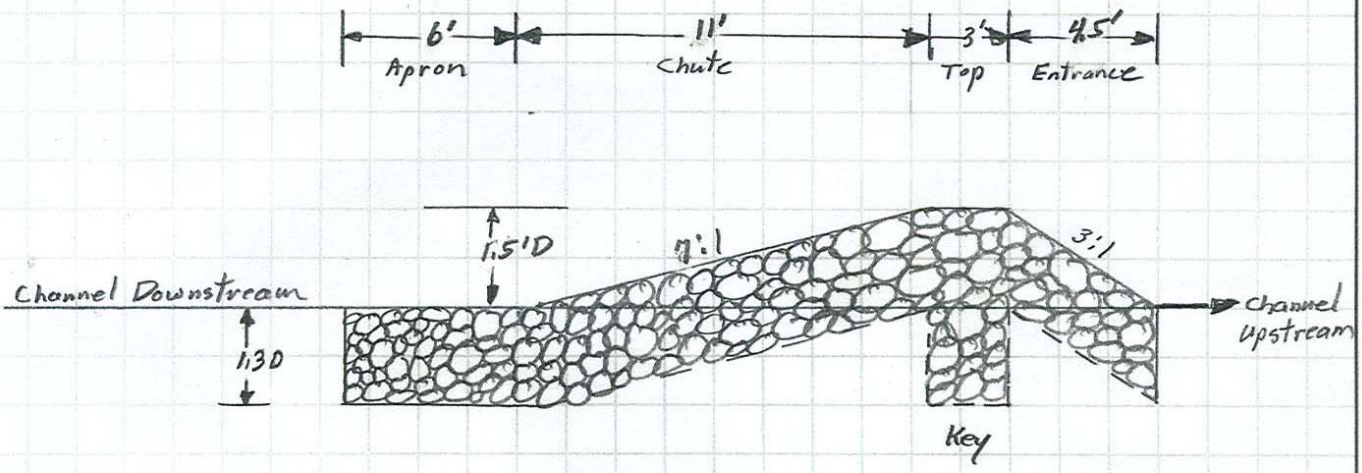
SHEET NO. 1 OF 3

CALCULATED BY _____ DATE _____

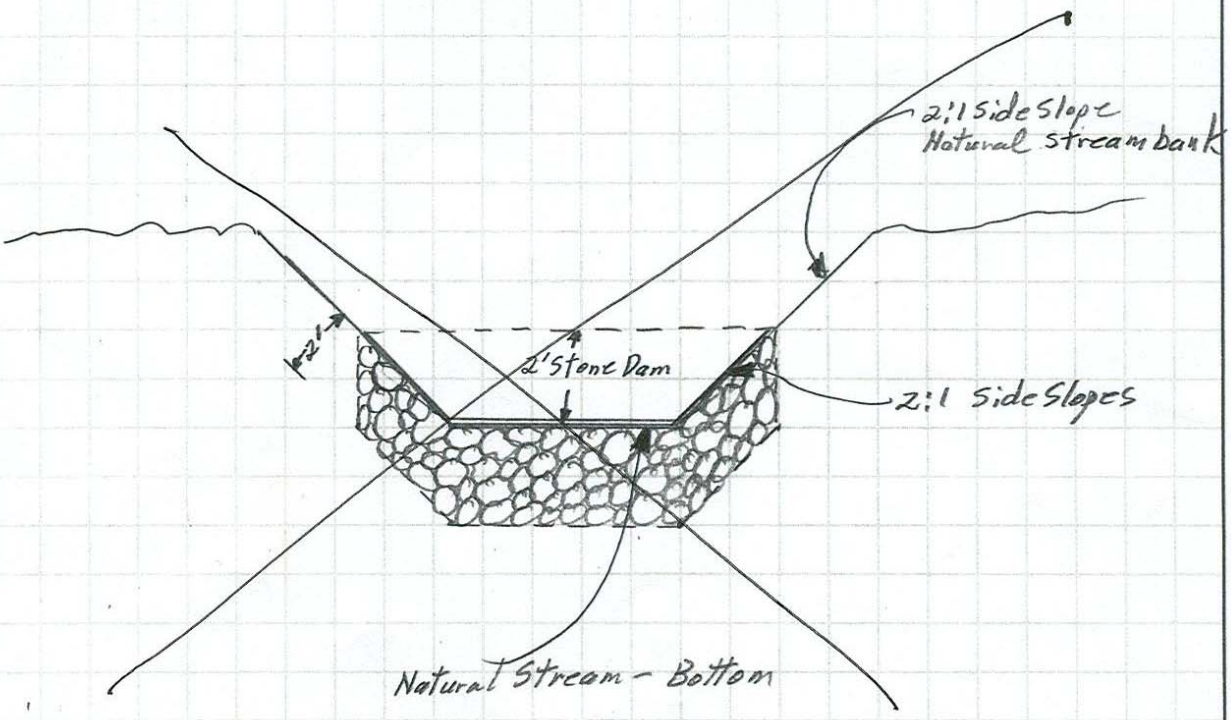
CHECKED BY _____ DATE _____

SCALE _____

Side View



~~Cross-Section~~ View



3-3

JFNew

JOB Little Cedar – Tom Henney Property

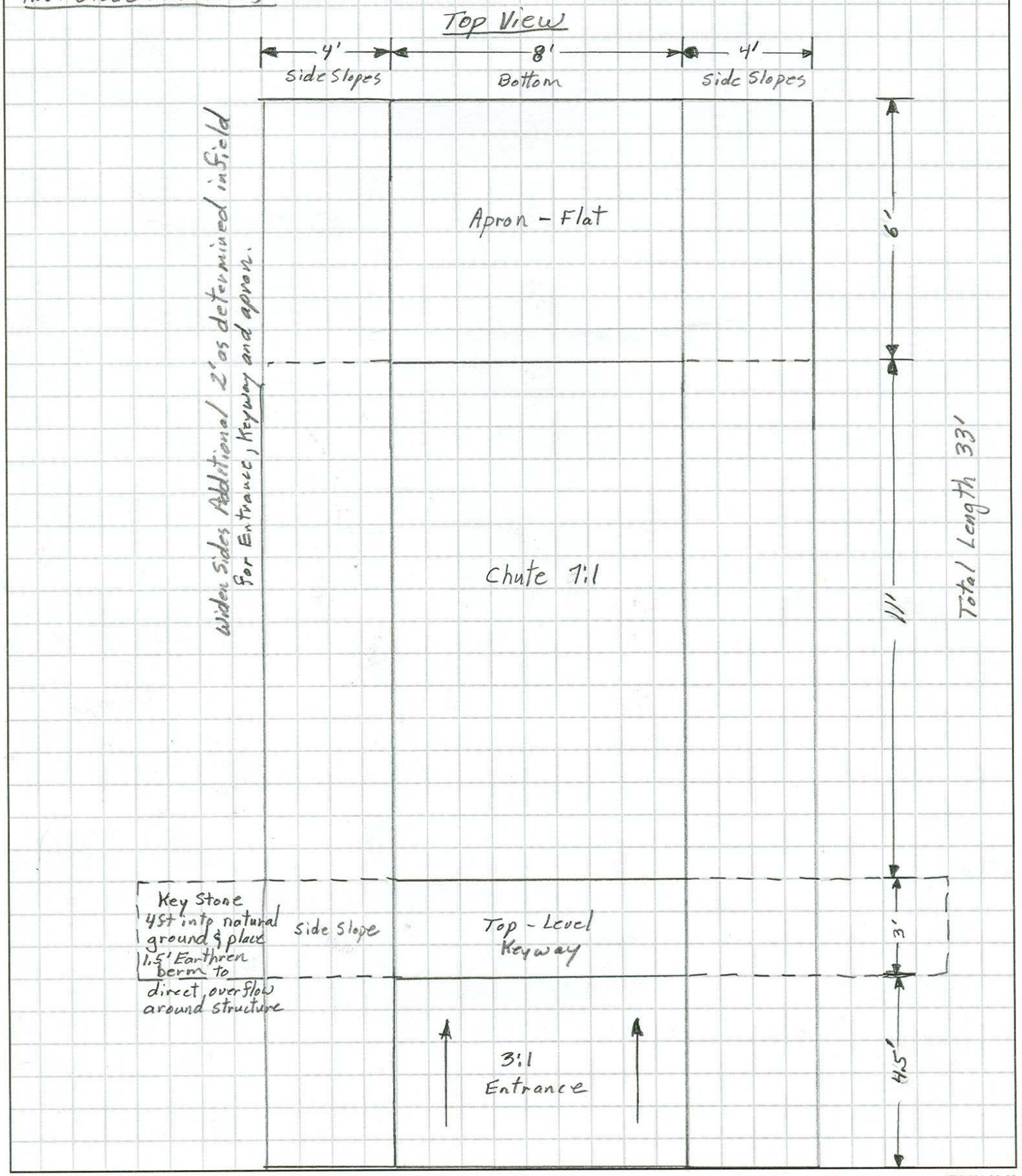
SHEET NO. 2 OF 3

CALCULATED BY W. Stanger DATE 1/21/2005

CHECKED BY _____ DATE _____

SCALE Not to Scale

Rock Grade Structures -Check Dams



JFNew

JOB Little Cedar Lake - LARE

SHEET NO. _____ OF _____

CALCULATED BY W. Stanger DATE _____

CHECKED BY _____ DATE _____

SCALE _____

Rock Check Dams Design Data

1. Existing stream has a grade of slightly less than 1%. A typical cross-section with high banks (3.5' plus) will carry approx. 230 cfs. Low bank areas carry (1.5') approx. 105 cfs. Velocity is 6 fps plus. Out of bank flow occurs frequently along low bank areas. Velocity exceeds 4 fps which is allowable for soil conditions.

2. 2yr - 24 Hr. Storm event = 95 cfs
   5yr - 24 Hr. Storm event = 148 cfs
   10yr - 24 Hr Storm event = 184 cfs w/construction of erosion control pond
   * Runoff calculations are combined from rock chute and pond design.

3. Stream capacity with check dams placed at high bank sites will be 68 cfs or protection for less than two year storm event. Four dams at 1.5' depth and one at 2' depth will reduce grade to 0.5% and drop velocity to approx. 3.5 fps which is permissible. Carrying capacity of the stream is greatly reduced as the placement of the check dams reduce grade and velocity. Out of bank flows will occur more frequently raising the possibility of over bank erosion occuring when the runoff re-enters the stream. It will be important to perform regular inspections and address any new erosion problems.

   NOTE: Rock check dams are not the best solution. However, construction of two sediment basins were determined economically unfeasible.

4. Due to the increased out of bank flow earthren berms will be constructed on each side of the rock dam to direct runoff around the structure into low flood areas rather than eroding around the structure.

5. Size of stone and dimensions for check dams based on NRCS-USDA criteria for designing "rock chutes".

   Stone (Lime) Size = D_{50} 8" 1.3' Depth Stone w/stone Keyway 7:1 Chute Slope, min 0.9 Depth of flow = Velocity 7.8 fps, 8' Bottom Max. velocity 7.9 fps and 150 cfs

JFNew

JOB

SHEET NO. OF

CALCULATED BY DATE

CHECKED BY DATE

SCALE

Stone Calculations

Apron – 1.3'D x 6'x 20' = 156 cu.ft

Chute – 1.3'D x 11'x 20' = 286 cu.ft.

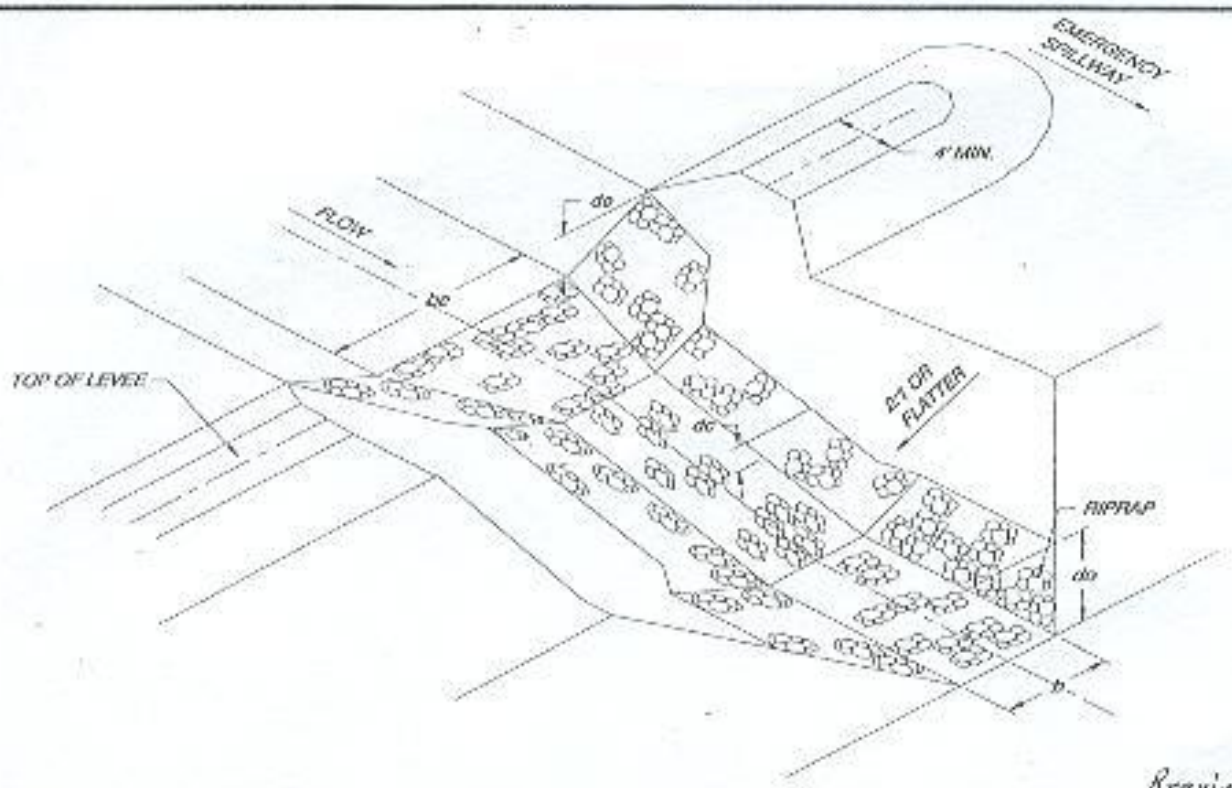
Entrance – 1.3'D x 4.5'x 20' = 117 cu.ft.

Keyway – 3.5'D x 3'W x 20' = 241 cu.ft.

Total 800 cu.ft x 110 lbs/cu.ft = 88,000 lbs or 44 Ton

44 Ton x 5 = 220 Tons plus 10% = 240 Ton

Filter Fabric = ???? Since we have Keyway



ROCK LINED CHUTE

Required cfs = 116
Design cfs = 118
Max. Velocity = 8.4 cfs
D50 9"
Design Velocity = 8.3 cfs

CONSTRUCTION DATA

OVERFALL (F) =	4	FEET
CHUTE SLOPE (S) =	6	:1
SIDE SLOPES (Z) =	2	:1
ENTRANCE LENGTH (Le) =	10	FEET
CHUTE LENGTH (Lc) =	24	FEET
OUTLET LENGTH (Lo) =	10	FEET
ENTRANCE ROCK HEIGHT (de) =	1.9	FEET
CHUTE ROCK HEIGHT (dc) =	1.4	FEET
OUTLET ROCK HEIGHT (do) =	2.3	FEET
BOTTOM WIDTH (b) =	14	FEET
ENTRANCE B.W. (be) =	Approx 20	FEET
RIPRAP THICKNESS =	18	IN
BEDDING THICKNESS =	6	IN

CONSTRUCTION ELEVATIONS

TOP OF LEVEE ELEV. =	923.4
EMERGENCY SPILL. ELEV. =	921.4
INLET ELEV. =	920.0
OUTLET ELEV. =	916.0

ESTIMATED QUANTITIES

CLEARING:	0.1	AC.
EXCAVATION & BACKFILL: (Berms)	Approx. 300	CU. YD.
RIPRAP:	100	TONS
BEDDING:	—	TONS
OR GEOTEXTILE FABRIC:	111	SQ. YD.
REVEGETATION:	0.25	AC.
OTHER:		

NOTES:

1. THE CHUTE SLOPE (S) SHALL NOT BE STEEPER THAN 5:1.
2. THE SIDES SLOPES (Z) SHALL NOT BE STEEPER THAN 2:1.
3. THE ENTRANCE APRON WIDTH SHALL VARY UNIFORMLY FROM (be) TO (b).
4. PROVIDE AN EMERGENCY SPILLWAY, ONE ON EACH SIDE IF FEASIBLE, WITH THE CREST ELEVATION 0.3' TO 0.5' BELOW TOP OF ROCK ON ENTRANCE SIDE SLOPES.
5. GEOTEXTILE FABRIC MAY BE USED IN LIEU OF BEDDING.
6. AFTER PLACEMENT OF RIPRAP, SPREAD ENOUGH SMALL RIPRAP FRAGMENTS OR BEDDING MATERIAL OVER ENTIRE SURFACE OF THE CHUTE TO FILL THE VOIDS IN THE RIPRAP AND COMPACT RIPRAP WITH CONSTRUCTION EQUIPMENT. A MIXTURE OF SOIL AND SEED MAY BE SPREAD OVER THE RIPRAP.
7. TILE OUTLETS SHALL NOT BE ROUTED THROUGH THE STRUCTURE.

NOT TO SCALE

LANDUSER Tom Henery
Whitley COUNTY ~~SWCD~~, INDIANA
LOCATION Little Cedar Lake
LAKE

ROCK LINED CHUTE

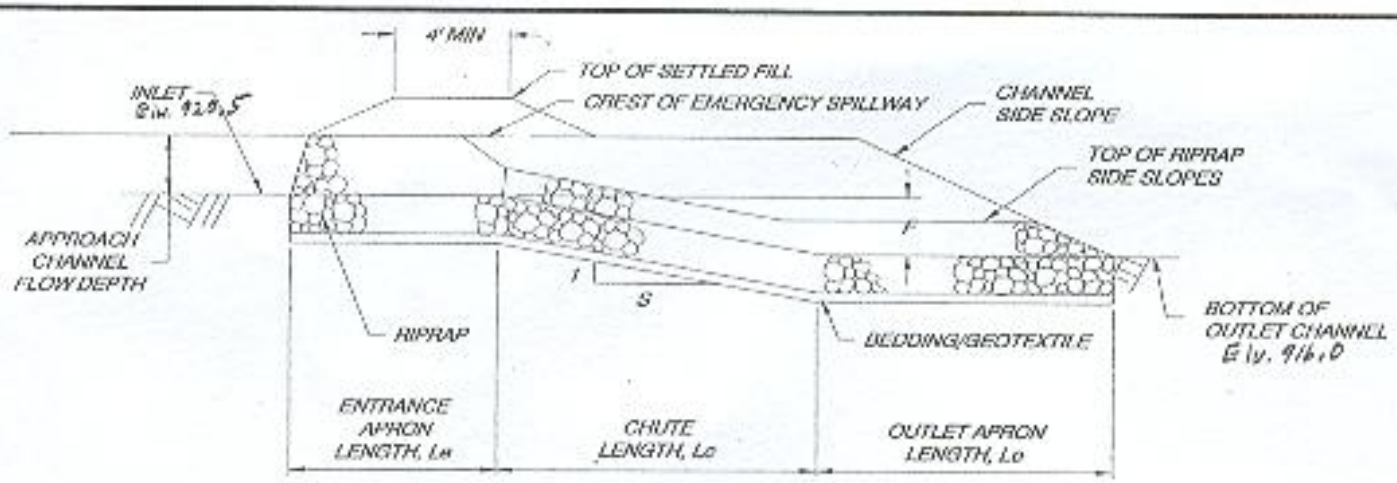
GENERAL LAYOUT
INDIANA

U.S. DEPARTMENT OF AGRICULTURE
NATURAL RESOURCES CONSERVATION SERVICE

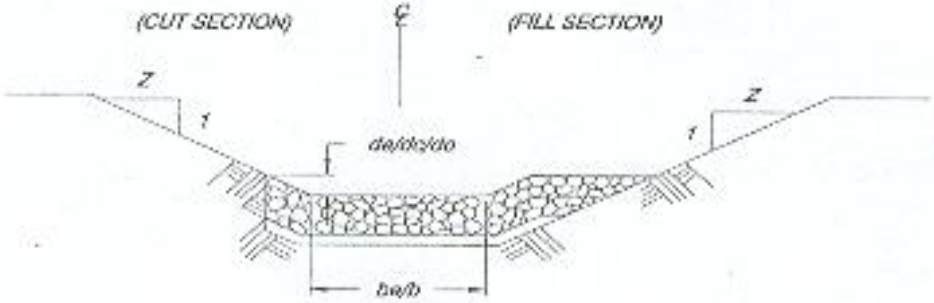
Designed	W. Stenger	5/05	Approved by	Date
Drawn			Title	
Traced			Title	
Checked			Sheet No.	Drawing No.

CRAWFORD, IN-ENG-38, 5, NOV. 1990

IN-ENG-38 IT OF 72



PROFILE ALONG CENTERLINE



TYPICAL CROSS SECTION

RIPRAP GRADATION

d50 = 9 INCHES

SIZE	% PASSING
	100%
	50%
	15%

BEDDING GRADATION

EQUIVALENT TO INDOT AGGREGATE # —

GEOTEXTILE

TYPE:	NON-WOVEN, NEEDLE-PUNCHED
TENSILE STRENGTH:	180 LBS. MIN.
BURSTING STRENGTH:	320 PSI MIN.
ELONGATION @ FAILURE:	50% MIN.
U.V. LIGHT RESISTANCE:	70% MIN.
PUNCTURE:	80 LBS. MIN.
PERMITTIVITY:	0.70 SEC $^{-1}$ MIN.

NOT TO SCALE

LANDUSER _____

_____ COUNTY SWCD, INDIANA

LOCATION _____

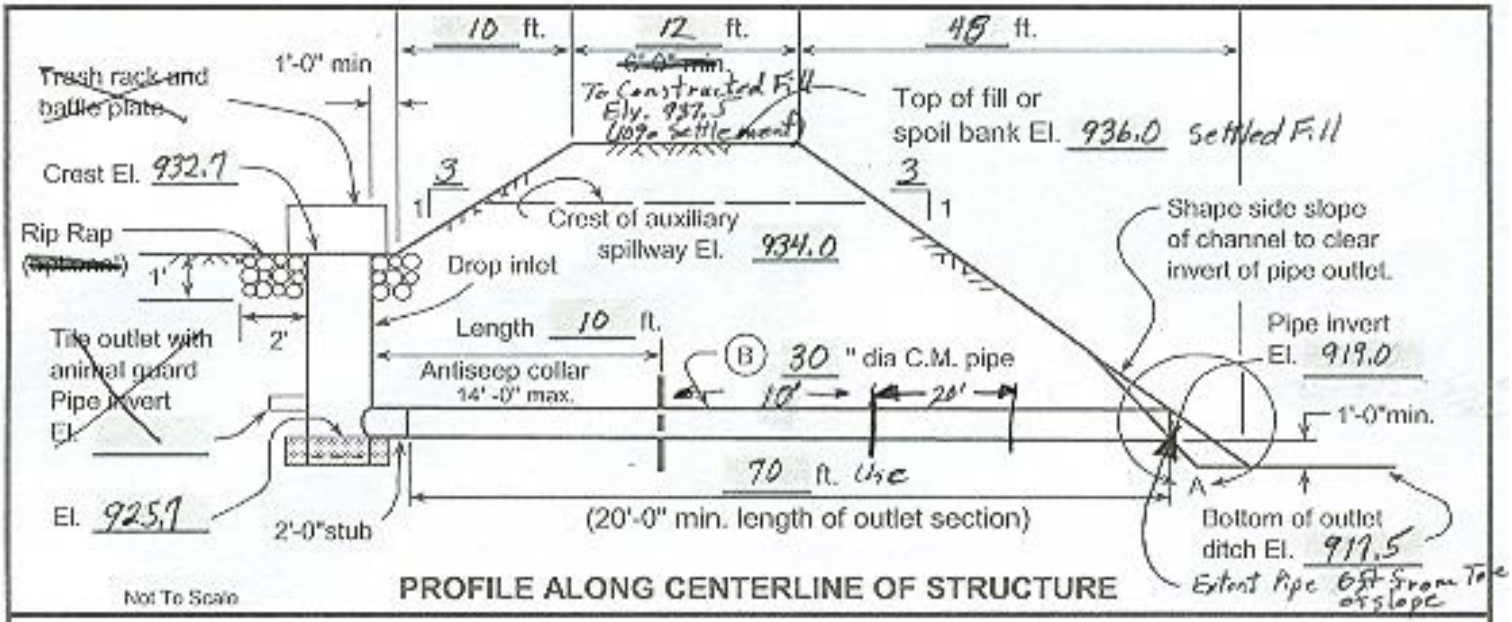
ROCK LINED CHUTE

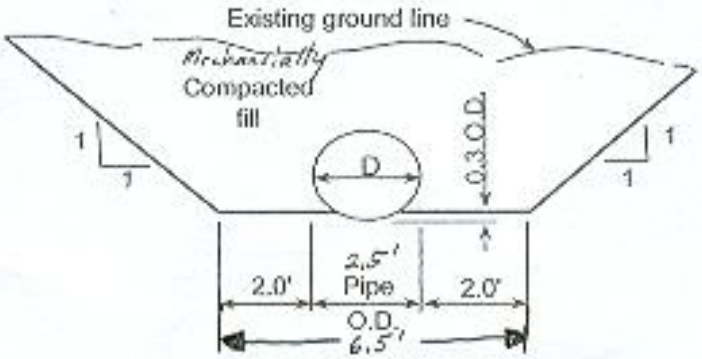
GENERAL LAYOUT
INDIANA

U.S. DEPARTMENT OF AGRICULTURE
NATURAL RESOURCES CONSERVATION SERVICE

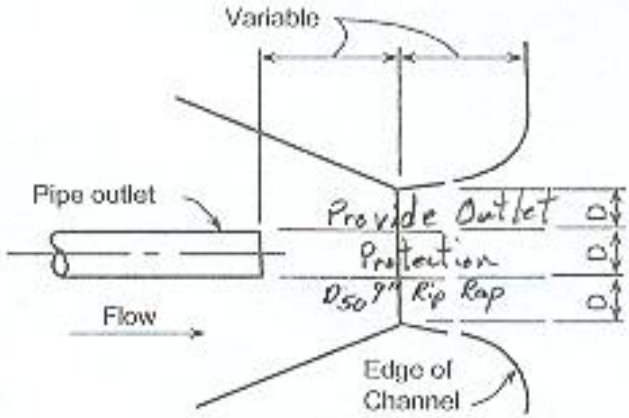
	Date		Date
Designed		Approved by	
Drawn		Title	
Traced		Title	
Checked		Sheet No.	Drawing No.

DRAWING NO. IN-ENG-38.XLS (REV. 1/05)





TYPICAL EXCAVATION AND BACKFILL FOR PIPE INSTALLATION



PLAN VIEW DETAIL A

ESTIMATE OF MATERIALS

ITEM	QUANTITY	
Excavation Core	200	Cu. Yds
Earth Fill	2856	Cu. Yds
Pipe 30 inch diameter (B) C.M. metal thickness 0.06" (16 ga.)	70	Lin. Ft.
Riser 48 inch diameter (A) C.M.	8	Lin. Ft Total Length
metal thickness 0.06" (16 ga.) C.M. (G)	7	Lin. Ft. To Flowline
Tile stub — inch diameter	~~0~~	Lin. Ft.
Animal guard — inch diameter	~~0~~	Each
Baffle plate 6ft	1	Each
~~Trash Rack~~	—	Each
Antiseep collar	3	Each
Concrete	1.5	Cu. Yds
Seeding and mulching		Acres
Rip Rap Riser D_{50} 5" Outlet Protection D_{50} 9"	3	Tons
12 x 18 x 12"D	18-20	Tons

Clearing 0.5-0.75 Ac.

SOIL INVESTIGATION REPORT

LOCATION OF BORINGS	DEPTH FEET	UNIFIED SOIL CLASSIFICATION

NOTE: Cutoff Trench – Extend up the abutments and be deep enough (min. 2ft) to extend into relatively impervious layer. Bottom width of 8ft to accommodate equipment for excavation, backfill and compaction. Side slopes 1:1 or flatter. Use most impervious material for backfilling the cutoff trench and constructing the core of the dam.

NRCS
Natural Resources Conservation Service
United States Department of Agriculture

DRAWING NO. IN-ENG-27.XLS 12/1/(REV. 5/03)

CORRUGATED METAL PIPE DROP STRUCTURE

Landuser Project No. 0301-23

Location Little Cedar Lake - LARE

Whitley County ~~[illegible]~~, INDIANA

Section ____ T ____ R ____

Designed Wayne Stenger 3/05

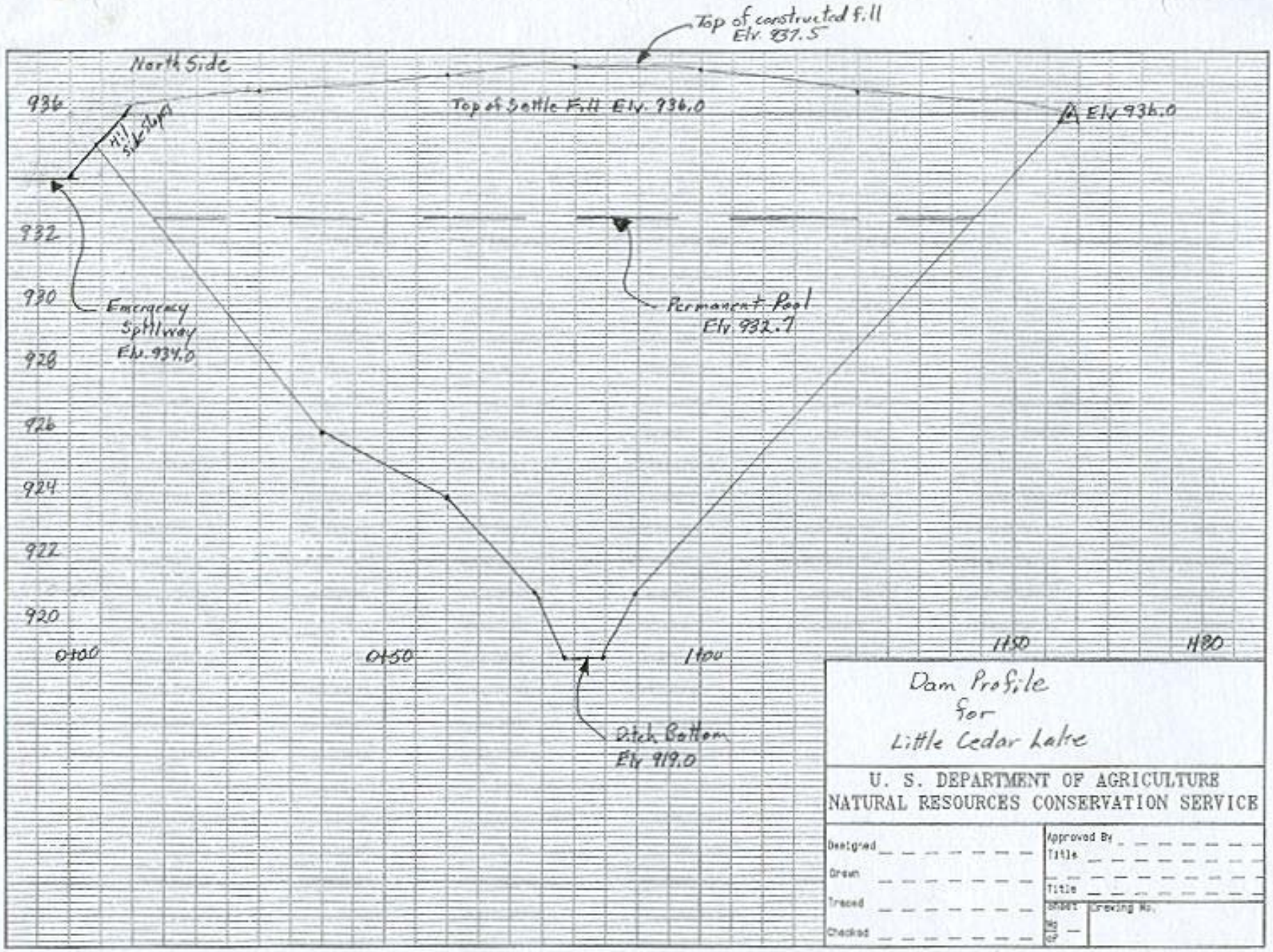
Drawn

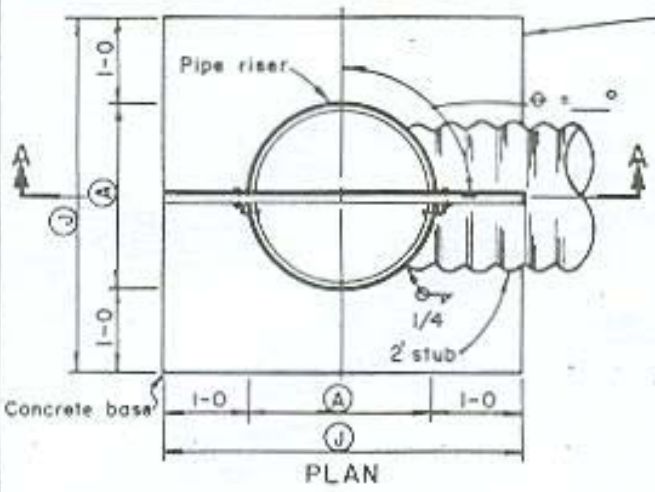
Checked

Approved

Title

Sheet ____ of ____





PLAN

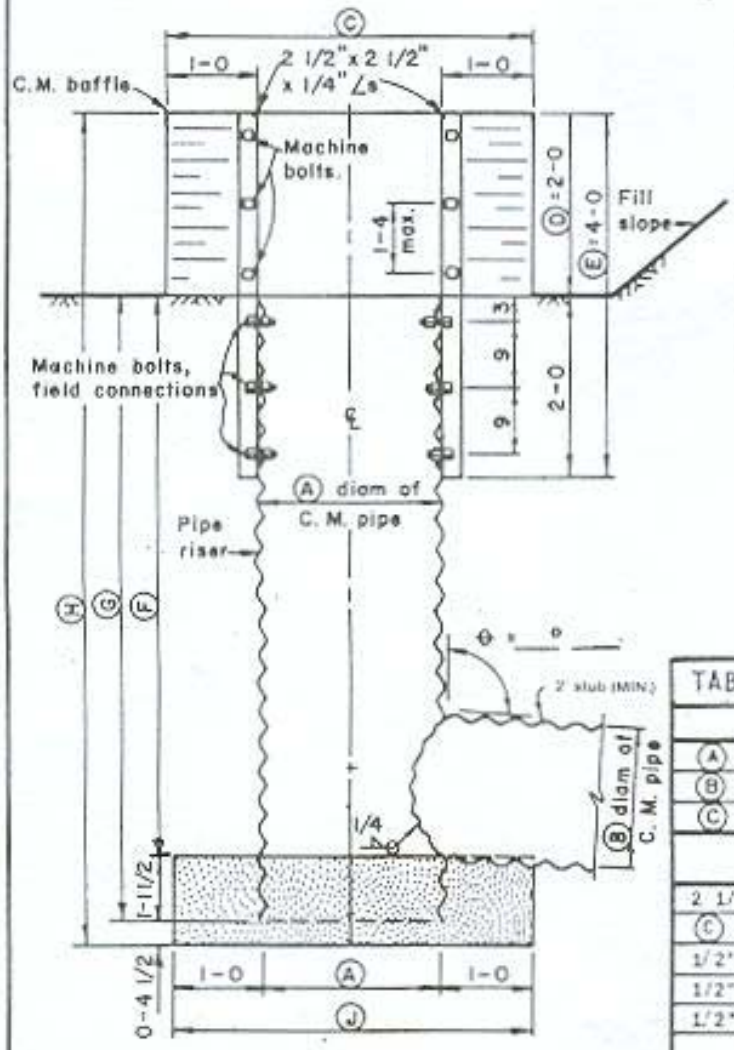
Concrete shall have a minimum compressive strength at 28 days equal to a minimum of 2500 lb./sq.in. (5 bag mix).

TABLE OF QUANTITIES FOR CONCRETE RISER BASE

DIA. OF RISER IN INCHES	18"	21"	24"	30"
CONCRETE, CU.YD.	0.68	0.78	0.89	1.12

48" - use 1.5 cu.yds
6X6"x1-1¼' Base

INLET PROPORTIONS (MIX.)		ANTIVORTEX BAFFLE
PIPE DIA. CONDUIT (B)	RISER DIA. (A)	LENGTH FEET (C)
8 TO 12	18	3-6
15	21	3-9
18	24	4-0
21 AND 24	30	4-6
30	48	6-0



SECTION ON CENTERLINE
SECTION A-A

DETAILS OF INLET

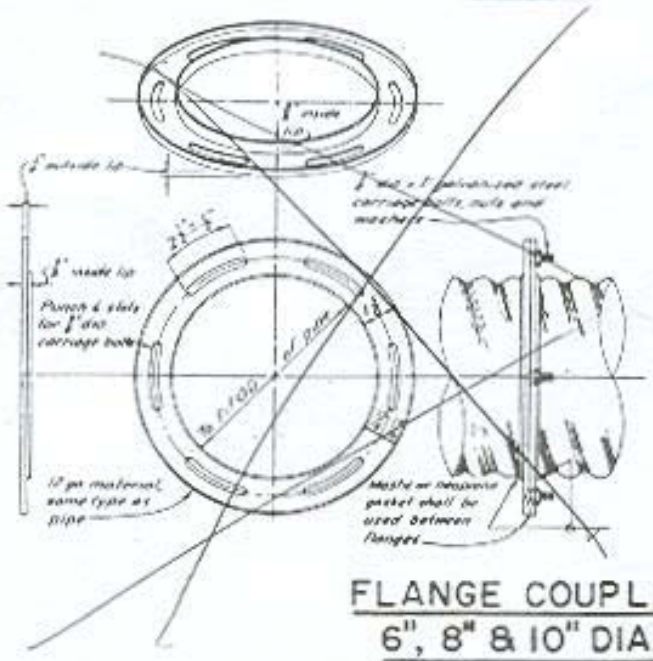
NOTES:

1. CORRUGATED METAL PIPE MAY BE MADE OF ALUMINUM OR ZINC-COATED IRON OR STEEL AND MEET FEDERAL SPECIFICATIONS, WW-P-302C OR WW-P-405A AND SHALL BE CLASS I OR II, SHAPE 1. USE 16 GAGE (THICKNESS = 0.06"),
2. ALL ACCESSORIES AND FASTENERS SHALL BE OF COMPATIBLE METALS THROUGHOUT STRUCTURE. GALVANIZED OR CADMIUM PLATED BOLTS, NUTS, AND WASHERS MAY BE USED.
3. ALL HOLES FOR BOLTS SHALL BE 1/16" LARGER THAN DIAMETER OF BOLTS.
4. DROP INLET SHALL BE SHOP FABRICATED.
5. ZINC-COATED METALS, AFTER WELDING OR CUTTING, SHALL BE REPAIRED AS FOLLOWS:
   (A) THOROUGHLY CLEAN THE DAMAGED AREAS ON BOTH SIDES OF THE PIPE WITH WIRE BRUSH.
   (B) PAINT THE CLEANED AREAS WITH TWO COATS OF ZINC OXIDE - ZINC DUST PAINT.
   (C) APPLY A HEAVY COAT OF ASPHALT OVER THE PAINTED AREAS.

TABLE SHOWING DIMENSIONS AND MATERIALS

DIMENSIONS			
(A) 48"	(D) 2-0	(G) 8-0	
(B) 30"	(E) 4-0	(H) 10-3	
(C) 6-0'	(F) 9-0	(J) 6-0	

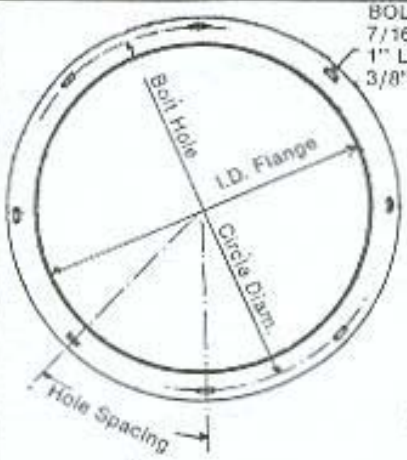
MATERIAL ITEMS	QUANTITY REQUIRED
2 1/2" X 2 1/2" X 1/4" ANGLES X (E) 4-0	2
(C) X (D) C.M. SHEET	1
1/2" X 1 1/4" MACHINE BOLTS	12
1/2" STEEL SPLIT LOCKWASHERS	12
1/2" NUTS	12



NOTES:
1. THE PIPE MAY BE HELICAL CORRUGATED METAL PIPE OR PIPE MATERIAL OF EQUIVALENT STRENGTH AND DURABILITY.
2. ALL WELDED, MARRED, AND CHECKED SURFACES SHALL BE FIELD COATED WITH A HEAVY APPLICATION OF FIBRATED ASPHALT-CEMENT.
3. COMPLETELY COAT WITH ASPHALT-CEMENT ALL CONTACT SURFACES OF FLANGES AND COLLARS BEFORE FIELD ASSEMBLY.

FLANGE COUPLING FOR 6", 8" & 10" DIA. PIPE

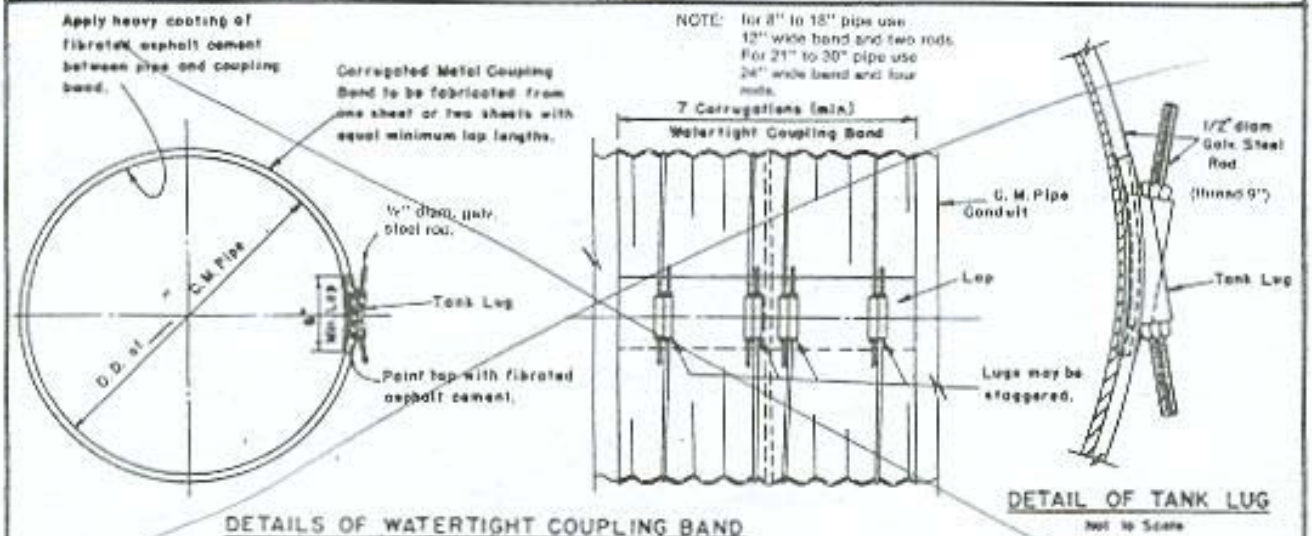
N.T.S.



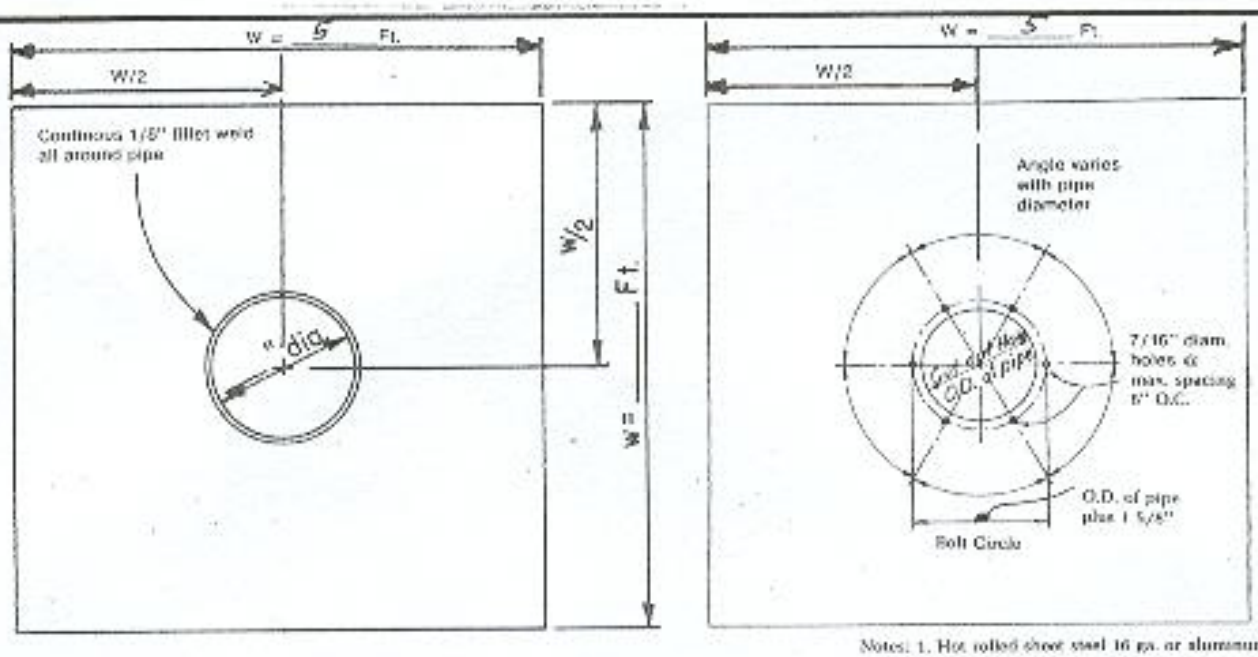
Pipe Diam. Inches	Min. No. Holes	Min. Spacing Inches
12	10	4.48
15	12	4.52
18	14	4.54
21	16	4.56
24	18	4.58
30	22	4.60

FLANGE COUPLINGS FOR 12" THRU 30" DIA. PIPE

NOTE: Notes for 6", 8" & 10" flange coupling apply for 12" thru 30" flange couplings N.T.S.

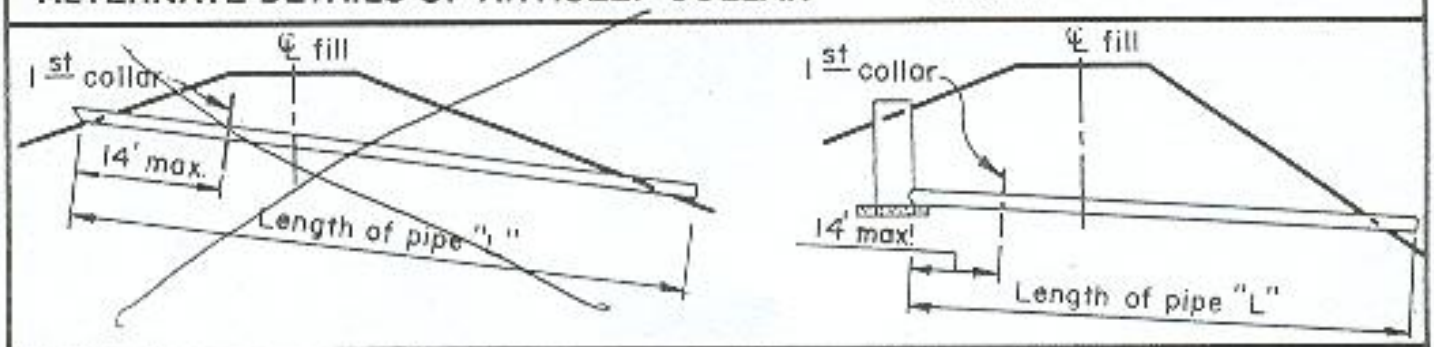


DETAILS OF WATERTIGHT COUPLING BAND 8" THRU 30" DIA. PIPE



Notes: 1. Hot rolled sheet steel 16 ga. or aluminum sheet — min. thickness 0.06".
2. Install C.M. antiseep collar with corrugations vertical.

ALTERNATE DETAILS OF ANTISEEP COLLAR



PIPE SIZE INCHES	MAXIUM SPACING FEET		LENGTH OF PIPE "L" IN FEET															
			50		60		70		80		90		100		110		120	
	SIZE COLLAR "W" FEET		SIZE COLLAR "W" FT.															
	4X4	5X5	4X4	5X5	4X4	5X5	4X4	5X5	4X4	5X5	4X4	5X5	4X4	5X5	4X4	5X5	4X4	5X5
6&8	20	25	2	2	2	2	2	2	3	3	3	3	4	3	4	4	4	4
10&12	20	25	2	2	2	2	3	2	3	3	4	3	4	4	4	4	5	4
15	19	25	2	2	3	2	3	2	4	3	4	3	5	4	5	4	6	4
18	18	25	2	2	3	2	3	2	4	3	4	3	5	4	5	4	6	4
21	15	23	2	2	3	2	4	3	4	3	5	4	5	4	6	4	7	5
24	14	21	3	2	3	2	4	3	5	3	5	4	6	4	7	5	7	5
30		18	—	2	—	3	—	3	—	4	—	4	—	5	—	5	—	6

NUMBER OF REQUIRED ANTISEEP COLLARS & spacing for 6" THRU 30" DIAMETER PIPE

BILL OF MATERIALS

QUANTITY	DESCRIPTION
3	Antiseep collar - 5 ft. or 5 ft. ~~round or~~ square
8	Flange coupling 30" 4 Joints
	Hex. HD. nuts, 3/8" x 1"
	Hex. HD. nuts, 3/8"
	Flat washers - cut steel, 7/16" I.D. x 7/8" O.D.
	Watertight coupling band, w/lug rods

ANTISEEP COLLARS AND COUPLING DEVICES FOR 6" THROU 30" C.M. PIPE

NAME _____

U.S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

Date
Designed
Drawn
Checked
Reviewed

Approved by
Title
Title
Sheet No. Of
Drawing No.

1. SCOPE

The work shall consist of furnishing and placing circular, arched or elliptical corrugated metal pipe and the necessary fittings as shown on the plans. This specification does not cover pipe designed for pressure flow.

2. MATERIALS

Zinc-coated, aluminum coated or aluminum-zinc alloy coated iron or steel corrugated pipe and fittings shall conform to the requirements of ASTM Specification A-760 for the specified type of pipe, and to the following additional requirements:

a. The sheet thickness, and the corrugation type and nominal size shall be as shown on the drawings.

b. Unless otherwise specified, circumferential shop riveted seams shall have a maximum rivet spacing of 6 inches, except that 6 rivets will be sufficient for 12-inch diameter pipe.

c. When close riveted pipe is specified: (1) the pipe shall be fabricated so that the rivet spacing in the circumferential seams shall not exceed 3 inches, except that 12 rivets will be sufficient to secure the circumferential seams in 12-inch pipe, and (2) in those portions of the longitudinal seams that will be covered by the coupling bands, the rivets shall have finished flat heads or the rivets and holes shall be omitted and the seams shall be connected by welding to provide a minimum of obstruction to the seating off the coupling bands.

d. Double riveting or double spot welding of pipe less than 42 inches in diameter may be required. If specified, the riveting or welding shall be done in the manner specified for pipe 42 inches or greater in diameter.

e. When specified, caulked seam corrugated metal pipe shall conform to the following additional requirements:

(1) Caulked seam corrugated metal pipe shall have all circumferential and horizontal seams caulked with an asphalt compound before riveting. This shall be accomplished by applying a uniform bead (1/4) inch minimum diameter) of the asphalt compound to the inner lap surface before riveting, such that when the rivets are in place, all voids are filled and a coating of asphalt is between the lap surfaces.

(2) The asphalt compound shall consist of an asphalt base combined with inert filler material to form a heavy-bodied compound that will not sag or run out of the seam. The compound shall contain 63 to 68 percent solids by weight. It shall be similar in type and equal in quality to Trumbull 5W Asphalt Mastic, knife grade, as manufactured by the Trumbull Asphalt Company of Delaware.

3. HANDLING THE PIPE

The contractor shall furnish such equipment as is necessary to place the pipe without damaging the pipe or coating. The pipe shall be transported and handled in such a manner as to prevent bruising, scaling or breaking of the spelter coating or bituminous coating.

4. REPAIR OF DAMAGED COATINGS

Breaks or scuffs on bituminous coatings that are less than 36 square inches in area shall be repaired by the application of two coats of hot asphaltic paint or a coating of cold-applied bituminous mastic. The repair coating shall be at least 0.05 inches after hardening and shall bond securely and permanently to the pipe. The material shall meet the physical requirements for the original coating. Whenever individual breaks exceed 36 square inches in area or when the total area of breaks exceeds 0.5 percent of the total surface area of the pipe, the pipe will be rejected.

DRAWING NO. CONSTRUCTION SPECIFICATION CORRUGATED

NRCS
Natural Resources Conservation Service
United States Department of Agriculture

CONSTRUCTION SPECIFICATION
CORRUGATED METAL PIPE

Landuser

Location

County SWCD, INDIANA

Section T R

Date

Designed 3/04

Drawn

Checked

Approved

File

Sheet of

5. LAYING AND BEDDING THE PIPE

Unless otherwise specified, the pipe shall be installed in accordance with the manufacturer's recommendations. The pipe shall be laid with the outside laps of circumferential joints pointing upstream and with longitudinal laps at the sides at about the vertical midheight of the pipe. Field welding of corrugated galvanized iron or steel pipe will not be permitted. Unless otherwise specified, the pipe sections shall be joined with water-tight coupling bands, with a minimum width of 12 inches, or flanges for a flange-type connection. The area between pipe and coupling band shall be coated with either an asphalt cement to insure a water-tight joint or a rubber neoprene gasket 3/8 inch thick and as wide as the connecting band + 1 inch.

The trench or foundation width in or on which the pipe will be laid should be at least: (1) 2 times the pipe diameter, or (2) the pipe diameter plus 2 feet, whichever is the greater.

Pipe should be laid on a moist, compacted foundation (not wet nor hard and dry). Just before the pipe is laid, spread a 2 to 3 inch layer of moist loose soil for the pipe to be placed on. The pipe should make uniform contact with the soil along its entire length.

Perforated pipe shall be laid with perforations down and oriented symmetrically about a vertical centerline. Perforations shall be clear of any obstructions at the time the pipe is laid.

6. BACKFILLING

The pipe shall be loaded sufficiently during backfilling around the side to prevent its being lifted from the bedding.

Backfill around the pipe shall be placed in layers not more than 6 inches thick before compaction. Each layer of backfill shall be compacted with power tampers or hand tamping to a greater density than the surrounding undisturbed soil. Backfill over and around the pipe shall be brought up uniformly on all sides and shall extend a minimum of 2 feet over the pipe before earth embankment with earth moving equipment over the pipe is started. Special care shall be taken not to disturb the grade and alignment during backfill operations.

7. ADDITIONAL ITEMS WHICH APPLY TO THIS JOB

DRAWING NO. CONSTRUCTION SPECIFICATION CORRUGATED I

NRCS
Natural Resources Conservation Service
United States Department of Agriculture

CONSTRUCTION SPECIFICATION
CORRUGATED METAL PIPE

Landuser _____

Location _____

County SWCD, INDIANA

Section T R

Date

Designed 3/04

Drawn .....

Checked .....

Approved .....

Title

Sheet ___ of ___

JFNew

JOB _____

SHEET NO. _____ OF _____

CALCULATED BY _____ DATE _____

CHECKED BY _____ DATE _____

SCALE _____

Design Notes:

1. Purpose – Reduce gully erosion within the project area, provide fish and wildlife habitat, reduce peak flow (reduce stream erosion), and allow some sedimentation from watershed runoff.

2. Hazard to homes downstream unknown – should a dam failure occur
Design for dams in predominantly rural or agricultural areas.

3. Watershed to Pond size = 60:1 -- This is considered high. Will require larger than normal principal spillway.

4. Minimum depth by NRCS standards is 8' over at least 25% of the pond. (I recommend 10' w/a deep hole of 12-14')

5. No woody growth should exist on the embankment or spillway or within 25'.

6. Foundation cutoff: Shall extend up the abutments and be deep enough (2' minimum) to extend into a relatively impervious layer. Bottom width of cutoff will be a minimum of 8' width to accommodate equipment for excavation, backfill and compaction. Side slopes will be know steeper than 1:1. The most impervious material available will be used backfill the cutoff trench and construct the core of the dam.

7. Top of dam shall be 12ft-width

8. Front and back slopes shall be 3:1

9. The top elevation to be minimum of 1' above the water level in the emergency spillway when flowing to design capacity. A minimum of 2' difference between crest of emergency and top of settled dam.

10. 10% settlement to be added to top of dam during construction

11. Minimum 1.5" Detention Storage or Q5yr storm

12. Emergency Spillway = Q25

U.S. Department of Agriculture
Natural Resources Conservation Service

IN-ENG-36Q
Rev. 1/00

ROCK LINED CHUTE QUANTITIES

Landuser: Little Cedar Lake - Tom Kenney Property County: LaPorte
Designed by: M Stanger Date: 3-1-05 Checked by: _____ Date: 3-1-05

Rock Lined Chute Parameters:

Bottom Width (b):	b = 14	feet
Chute Flow Depth (d):	d = 0.9	feet
Controlled Drop (F):	F = 4	feet
Chute Profile Slope (S):	S = 6	:1
Chute Side Slopes (Z):	Z = 2	:1
Rock Size (d50):	d50 = 9	inches
Rock Lining Thickness (tr):	tr = 18	inches
Rock Density (Dr):	Dr = 110	pcf
Bedding Thickness (tb):	tb = 6	inches
Bedding Density (Db):	Db = 110	pcf

Volume of Rock:

Entrance Section:

d_e = 1.9 feet L_e = 10 feet b_e = 20 feet

Upstream End Volume of Rock/Foot (at tr = 1'):
$V_u = b_e + 2(d_e)(z^2+1)^{0.5} + A^*$ V_u = _____ cf/ft

Downstream End Volume of Rock/Foot (at tr = 1'):
$V_d = b + 2(d_e)(z^2+1)^{0.5} + A^*$

$V_E = (V_u + V_d)\ (0.5)\ (tr)\ (L_e)$ 17 Ave W x 28' x 10' = 306 cu ft V_E = _____ cf/ft
Slope 8' x 1.8 x 10' = 144 / 450 x 110 = 25 Ton V_E = _____ cu. ft.

Chute Section:

d_c = _____ feet L_c = _____ feet

Volume of Rock/Foot (at tr = 1'):
$V_c = b + 2(d_c)(z^2+1)^{0.5} + A^*$ 24' x 28' x 20' = 264 x 110 = 48 Ton

$V_C = (V_c)\ (tr)\ (F)\ (S^2+1)^{0.5}$ V_C = _____ cf/ft
V_C = _____ cu. ft.

Outlet Section:

d_o = _____ feet L_o = _____ feet

Volume of Rock/Foot (at tr = 1'):
$V_o = b + 2(d_o)(z^2+1)^{0.5} + A^*$ 10' x 2 x 28' x 20' W = 360 cu ft x 110 = 20 Ton V_o = _____ cf/ft

$V_O = (V_o)\ (tr)\ (L_o)$ V_O = _____ cu. ft.

Total Volume of Rock:

$V_r = (V_E) + (V_C) + (V_O)$ V_r = _____ cu. ft.

Quantity of Rock: (Vr) (Dr / 2000) = Total 93 tons Max 100

Volume of Bedding:

$V_b = (V_r)\ (tb/tr)$ V_b = _____ cu. ft.

Quantity of Bedding: (Vb) (Db/2000) = _____ tons

Quantity of Geotextile Fabric:

gf = (Vr)/(tr) gf = 1000 sq. ft.

Add 10% for laps, ends, waste, etc.

Geotextile fabric required: Gf = (1.1) (gf) = _____ sq. ft.

Gf ÷ 9 = 111 sq. yd.

* correction for fill section (see EFM Figure IN-6-11)

DESIGN DATA

DRAINAGE AREA _____ ACRES, POND AREA _____ ACRES, RATIO DRAINAGE AREA TO POND AREA _____

RUNOFF CURVE NO. _____, AVE. W.S. SLOPE: FLAT, MODERATE, STEEP (CIRCLE ONE)

TOP OF SETTLED FILL ELEV. _____ LOW POINT ON $\mathcal{L}$ FILL ELEV. _____

EMERGENCY SPILLWAY

26 cfs from Pond 25 yr Storm
32 cfs 25 yr Storm

DESIGN Q = _____ AC X _____ CFS/AC = ~~58 total~~ CFS, MAXIMUM VELOCITY 4.0 FT/S

RETARDANCE C, DISCHARGE q 1.5 CFS/FT. L 40 FT

BOTTOM WIDTH b (STABILITY) = $\frac{\text{DESIGN Q}}{\text{DISCHARGE q}}$ = 38.7 FT, Hp = 1.0 FT.

BOTTOM WIDTH b (USED) 40 FT, DISCHARGE q (USED) = $\frac{\text{DESIGN Q}}{b}$ = 1.45 CFS/FT.

Hp (USED) 1.0 FT. MIN. SLOPE 1 %, MAX. SLOPE 12 %, EXIT SLOPE (ACTUAL) _____

FREEBOARD 1.0 FT., EMERGENCY SPILLWAY CREST ELEV. 921.4

PRINCIPAL SPILLWAY

METHOD I - MINIMUM DETENTION STORAGE

STORAGE = _____ IN. X _____ AC./12 _____ AC. FT., REQUIRED STAGE = $\frac{\text{STORAGE (AC. FT.)}}{\text{POND AREA (AC.)}}$ = _____ FT.

PIPE DIAMETER _____ IN., TYPE _____

IS STAGE SUFFICIENT FOR PIPE FLOW: YES _____ NO _____

METHOD II - SHORTCUT FLOOD ROUTING

DESIGN STORM FREQUENCY _____ YEAR 24 HR., RAINFALL _____ IN., RUNOFF Vr _____ IN.

TYPE PIPE _____

STAGE FT.	Vs AC. FT.	Vs IN.	TABLE A				TABLE B		PIPE DATA				RISER DATA	
			Vs Vr	Qo Qi	QI CFS	Qo CFS	Qo CFS /AC	Qo CFS	DIA. IN.	WILL PIPE FLOW FULL	ACTUAL HEAD FT.	Qo CFS	DIA. IN.	IS STAGE SUFFICIENT FOR Qo

HOOD INLET OR FLARED INLET DATA

PIPE DIA. SELECTED _____ IN., STAGE PROVIDED _____ FT., STORAGE PROVIDED _____ AC.FT.

PIPE INLET INVERT ELEV. _____, PIPE OUTLET INVERT ELEV. _____, PIPE LENGTH _____ FT.

DROP INLET DATA

PIPE DIA. _____ IN., RISER DIA. _____ IN., STAGE REQUIRED _____ FT.

STORAGE REQUIRED _____ AC.FT., PIPE LENGTH _____ FT., RISER LENGTH _____ FT.

CREST OF RISER ELEV. _____ FT., OUTLET OF PIPE INVERT ELEV. _____ FT.

PHYSICAL DATA

MAXIMUM FILL HEIGHT _____ FT.

MAXIMUM WATER DEPTH _____ FT.

HAZARD CLASSIFICATION _____

DETENTION STRUCTURE DATA

Rock Chute

NAME _____

U.S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

Date	Approved by
Designed	Title
Drawn	Title
Checked	Sheet No. ... Of.
Reviewed	Drawing No. 7

U.S. Department of Agriculture
Soil Conservation Service

IN-ENG-10
Rev. 10/89
File Code 210-11

259

WORKSHEET IN-1: RUNOFF CURVE NUMBER (CN)

Client _____ Practice and ID _____

_____ County Soil and Water Conservation District, Indiana

By _____ Date _____ Checked by _____ Date _____

COVER TYPE TREATMENT 1/	HYDROLOGIC CONDITION 2/	CURVE NUMBER (CN) Hydrologic Soil Group (EFM Table IN-2-2) A	B	C	D	AREA, ACRES	PRODUCT OF CN X ACRES
Row Crops - Straight Row	poor	72	81	88	91		
	good	67	78	85	89		
- Straight Row + CR	poor	71	80	87	90	9.6	720
	good	64	(75)	(82)	85	72	5904
- Contoured + CR	poor	69	78	83	87		
	good	64	74	81	85		
Small Grain - Straight Row	poor	65	76	84	88		
- Straight Row + CR	good	63	75	83	87		
Pasture or Grassland	poor	68	79	86	89		
	good	39	61	74	80		
Meadow - Not Grazed	--	30	58	71	78		
Woods	poor	45	66	77	83		
	good	30	55	(70)	77	13	910
Farmsteads	--	59	(74)	(82)	86	3 6	222 492
Streets and - Paved w/ Curb	--	98	98	98	98		
Roads - Paved w/ Ditches	--	83	89	92	93		
Residential - 1/4 acre lots 3/	--	61	75	83	87		
- 1/2 acre lots	--	54	70	80	85		
- 1 acre lots	--	51	68	79	84		
Other (Specify)							
				TOTALS		1026	8240
						ACRES	

1/ Crop residue cover (CR) applies if residue is on at least 5% of the surface throughout the year.
2/ See EFM Table 2-3 for definitions.
3/ Includes subdivision streets and driveways.

Weighted CN = $\frac{\text{Product Total}}{\text{Total Acres}}$ = 79.6 ; Use CN = 80

(Do not use less than CN 60 without approval of area engineer)

JFNew

JOB
SHEET NO. OF
CALCULATED BY DATE
CHECKED BY DATE
SCALE

Hydrologic Soils Group – East Lake – South W/S

MxC3	C
BmB2	
GsB2	
RcB	
Co	
RcB	
GtB3	
Pw	
BmA	
MvB2	

Watershed Slope

Contour	Length
990	600
980	1500
970	3300
960	4700
950	3200
940	2600
930	850
Total	17,250

$$Y = \frac{100CI}{A} = \frac{100(17250 \times 10)}{104 \times 43560} = \frac{17250000}{4530240} = 3.8\%$$

JFNew

JOB
SHEET NO. OF
CALCULATED BY DATE
CHECKED BY DATE
SCALE

#1

		Accumulated
924	337	337
926	113	450
928	120	570
930	86	656
932	92	748
934	93	841

#2

		Accumulated
924	29	29
926	312	341
928	217	558
930	159	717
932	117	834
934	134	968

#3

924	0	0
926	50	50
928	347	397
930	199	596
932	145	741
934	153	894

#4

924	0	0
926	0	0
928	92	92
930	408	500
932	209	708
934	145	853

#5

924	0	0
926	0	0
928	0	0
930	537	537
932	259	796
934	200	996

#6

924	0	0
926	0	0
928	0	0
930	200	200
932	274	474
934	231	705

#7

			Totals
924	0	0	924
926	0	0	926
928	0	0	928
930	13	13	930
932	125	138	932
934	100	238	934

	Sq.In	× 1600 sqft/Sq.In / 43560		
366	3.66	0.13		
841	8.41	0.31		
1617	16.17	0.59		
3219	32.19	1.18		
3722	37.22	1.37	1.52	Estimated
5495	54.95	2.02	2.3	Estimated

(11)

Backup Data

DESIGN DATA

DRAINAGE AREA 64 ACRES, POND AREA 1.0 ACRES, RATIO DRAINAGE AREA TO POND AREA 64:1

RUNOFF CURVE NO. 80, AVE. W.S. SLOPE: FLAT, MODERATE, STEEP (CIRCLE ONE)

TOP OF SETTLED FILL ELEV. 936.0 LOW POINT ON ℄ FILL ELEV. 922.0

Pipe outlet 921.0 into existing ditch

EMERGENCY SPILLWAY

DESIGN Q = 64 AC X 0.5 CFS/AC = 32 CFS, MAXIMUM VELOCITY 4 FT/S

RETARDANCE C, DISCHARGE q 1.5 CFS/FT. L 25 FT

BOTTOM WIDTH b (STABILITY) = DESIGN Q / DISCHARGE q = 21.3 Use 25' FT, Ho = 1.0 FT.

BOTTOM WIDTH b (USED) 25' FT, DISCHARGE q (USED) = DESIGN Q / b = 1.28 CFS/FT.

Ho (USED) 1.0 FT. MIN. SLOPE 1 %, MAX. SLOPE 12 %, EXIT SLOPE (ACTUAL) Greater

FREEBOARD 1.0 FT., EMERGENCY SPILLWAY CREST ELEV. 934.0

May need protection or route to flatter slopes

PRINCIPAL SPILLWAY

METHOD I - MINIMUM DETENTION STORAGE Elev. 933.0

STORAGE = ____ IN. X ____ AC./12 ____ AC. FT., REQUIRED STAGE = STORAGE (AC. FT.) / POND AREA (AC.) = ____ FT.

PIPE DIAMETER ____ IN., TYPE ____

IS STAGE SUFFICIENT FOR PIPE FLOW: YES ____ NO ____

METHOD II - SHORTCUT FLOOD ROUTING

DESIGN STORM FREQUENCY 5 YEAR 24 HR., RAINFALL 3.4 IN., RUNOFF Vr 1.56 IN.

TYPE PIPE CMP 70' Length n = 0.02

STAGE FT.	Vs AC. FT.	Vs IN.	TABLE A Vs/Vr	TABLE A Qo/Qi	TABLE A Qi CFS	TABLE A Qo CFS	TABLE B Qo CFS/AC	TABLE B Qo CFS	PIPE DATA DIA. IN.	PIPE DATA WILL PIPE FLOW FULL	PIPE DATA ACTUAL HEAD FT.	PIPE DATA Qo CFS	RISER DATA DIA. IN.	RISER DATA IS STAGE SUFFICIENT FOR Qo
1.0	1.0	0.19	.12	.84	57	48	—	—	30	Yes Flatter than 1:5	12.5	74.1	60+	43 - No
1.3	1.3	0.24	.154	.79	57	45	—	—	30	Flatter than Critical Slope	13.5	67.9	48	57 Yes
1.4	1.4	0.26	.167	.77	73	56	—	—	30		11.5	67.9	48	57 Yes

1.3 Stage 10 yr

HOOD INLET OR FLARED INLET DATA

PIPE DIA. SELECTED ____ IN., STAGE PROVIDED ____ FT., STORAGE PROVIDED ____ AC.FT.

PIPE INLET INVERT ELEV. ____, PIPE OUTLET INVERT ELEV. ____, PIPE LENGTH ____ FT.

DROP INLET DATA

PIPE DIA. 30 IN., RISER DIA. 48 IN., STAGE REQUIRED 1.3 FT.

STORAGE REQUIRED 0.24 AC.FT., PIPE LENGTH 70 FT., RISER LENGTH 8' Total FT.

CREST OF RISER ELEV. 932.7 FT., OUTLET OF PIPE INVERT ELEV. 921.0 FT. 7' To Flow Line

PHYSICAL DATA

MAXIMUM FILL HEIGHT 14 FT.

MAXIMUM WATER DEPTH 10.7 FT.

HAZARD CLASSIFICATION

2 Homes down stream which could be effected if dam fails.

DETENTION STRUCTURE DATA

NAME Cedar Lake - West Lake
Tom Hennessy - LARE
Project No. 03-01-01

U.S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

Designed Wayne Stenger Date 5/05 Approved by ____

Drawn ____ Title ____

Checked ____ Title ____

Reviewed ____ Sheet No. ____ Of ____ Drawing No. ____

U.S. Department of Agriculture
Soil Conservation Service

IN-ENG-10A
Rev. 10/89
File Code 210-11

West Lake

WORKSHEET IN-2: TIME OF CONCENTRATION AND PEAK DISCHARGE

Client LARE Tom Henny (Cedar Lake) Practice and ID Project No 03-01-01

Whitley / Noble County Soil and Water Conservation District, Indiana

By W. Stenger Date 10/19/04 Checked by _____ Date _____

Estimating Time of Concentration

1. Data:

Rainfall Distribution Type ..... = II

Drainage Area (IN-ENG-10) ..... A = 64 acres

Runoff Curve Number (IN-ENG-10) ..... CN = 80

Watershed Slope ..... Y = 3.3 %

Flow Length ..... l = 4000 feet

2. T_c using l, Y, CN and EFH Figure 2-27 (page 2-41) ..... T_c = 0.88 hours

or using EFH Equation 2-5:

$$T_c = \frac{l^{0.8}(1000/CN - 9)^{0.7}}{1140\ Y^{0.5}} = \frac{(\quad)^{0.8}(\quad)^{0.7}}{1140\ (\quad)^{0.5}} \quad \ldots\ldots\ldots T_c = \_\_\_\_\_ \text{ hours}$$

Estimating Peak Discharge:

		Storm #1	Storm #2	Storm #3	
1.	Frequency ..... year	5	25	2	10
2.	Rainfall, 24-hour, inches (Figure IN-2-1) ..... P =	3.4	4.5	2.7	3.9
3.	Initial Abstraction ..... I_a = (Use CN with EFH Table 2-4, page 2-89)	0.500	0.500	.500	.50
4.	Compute I_a/P ratios ..... I_a/P =	0.147	0.111	0.185	0.12
5.	Unit Peak Discharge, cfs/acre/inch ..... q_u = (Use T_c and I_a/P with EFH Exhibit IN-2-I)	0.57	0.59	0.56	0.5
6.	Runoff, inches ..... Q = (Use P and CN with EFH Figure 2-26 or Table 2-2)	1.56	2.46	1.03	1.9
7.	Ponding and Swampy Area Adjustment Factor ..... F_p = (Use percentage of area and EFH Table IN-2-1)	—	—		
8.	Peak Discharge, cfs ..... q_p = (Where $q_p = q_u A Q F_p$) 1.56×64×0.57 2.55×78×0.61	57	93	37	73
		8.3 acft		10.5 acft	

1.56 × 64 × 0.57 =
2.46 × 64 × 0.59 =
1.03 × [illegible] × 0.56 =
[illegible] × 64 × 0.58 =

(13)

U.S. Department of Agriculture
Soil Conservation Service

IN-ENG-10
Rev. 10/89
File Code 210-11

West Lake

WORKSHEET IN-1: RUNOFF CURVE NUMBER (CN)

Client LARE Tom Henny (Cedar Lake) Practice and ID Project No. 03-01-01

Whitley/Noble County Soil and Water Conservation District, Indiana

By W. Stanger Date 10/19/04 Checked by _____ Date _____

COVER TYPE	TREATMENT 1/	HYDROLOGIC CONDITION 2/	CURVE NUMBER (CN) Hydrologic Soil Group (EFM Table IN-2-2) A	B	C	D	AREA, ACRES	PRODUCT OF CN X ACRES
Row Crops	Straight Row	poor	72	81	88	91		
		good	67	78	85	89		
	Straight Row + CR	poor	71	80	87	90	47.0	3854
		good	64	(75)	(82)	85	10.5	788
	Contoured + CR	poor	69	78	83	87		
		good	64	74	81	85		
Small Grain	Straight Row	poor	65	76	84	88		
	Straight Row + CR	good	63	75	83	87		
Pasture or Grassland		poor	68	79	86	89		
		good	39	61	74	80		
Meadow	Not Grazed	--	30	58	71	78		
Woods		poor	45	(66)	77	83	3.5	231
		good	30	55	70	77		
Farmsteads		--	59	74	(82)	86	2.0	164
Streets and Roads	Paved w/ Curb	--	98	98	98	98		
	Paved w/ Ditches	1320'x25'=76ac	83	89	(92)	93	1.0	92
Residential 3/	1/4 acre lots	--	61	75	83	87		
	1/2 acre lots	--	54	70	80	85		
	1 acre lots	--	51	68	79	84		
Other (Specify)								
					TOTALS		64 ACRES	5129

1/ Crop residue cover (CR) applies if residue is on at least 5% of the surface throughout the year.
2/ See EFM Table 2-3 for definitions.
3/ Includes subdivision streets and driveways.

Weighted CN = Product Total / Total Acres = 5129 / 64 = 80.1 ; Use CN = _____

(Do not use less than CN 60 without approval of area engineer)

JFNew

JOB
SHEET NO. OF
CALCULATED BY DATE
CHECKED BY DATE
SCALE

Hydrologic Soil Groups - West Lake / East Lake

Noble	MrB2	Marley	C
	BlA	Blount	C
	Pe	Pewamo	C/D
Whitley →	MsC3	Marley	C
	Wc	Wallkill	C/D
	Pw	Pewamo	C/D
	MxC3	Marley	C
	RcB	Rowson	B
	Co	Coesse	C/D
	GsB2	Glynwood	C
	BmB2	Blount	C
	RcC	Rowson	B
	HbA	Hoskins	C
	BmA	Blount	C
	GtB3	Glynwood	C
	MvB2	Marley	C
	HeG	Hennepin	B

West Lake
Watershed slope $Y = \frac{100\,CI}{A} = \frac{100\left(\frac{9250}{10750} \times 10\right)}{\frac{70}{64} \times 43560} = \frac{92500.0}{3347680} = 3.16\%$

92500.0
107500000
2797.8%
3.3

Contour			
-930	600		
940	1300		
950	1600		
960	1150		
970	2000		
980	2700	1610	
990	1400	1000	
	10750		
	-1500		
	9250		

JFNew

JOB Surface Acreage Calculations

SHEET NO. _____ OF _____

CALCULATED BY _____ DATE _____

CHECKED BY _____ DATE _____

SCALE _____

#1

928 = 31	31
930 = 172	203
931 = 98	301
932 = 115	416
933 = 132	548
934 = 121	669

#2

928 = 0	0
930 = 0	0
931 = 48	48
932 = 95	143
933 = 63	206
934 = 106	312

#3

924 = 233	233
926 = 384	384
928 = 455	455
930 = 682	682
931 = 43	725
932 = 42	767
933 = 33	800
934 = 23	823

#4

922 = 58	58
924 = 158	158
926 = 249	249
928 = 330	330
930 = 393	393
931 = 31	424
932 = 36	460
933 = 40	500
934 = 61	561

#5

922 = 262	
924 = 273	
926 = 393	
928 = 461	
930 = 514	
931 = 558	
932 = 583	
933 = 620	
934 = 651	

Totals

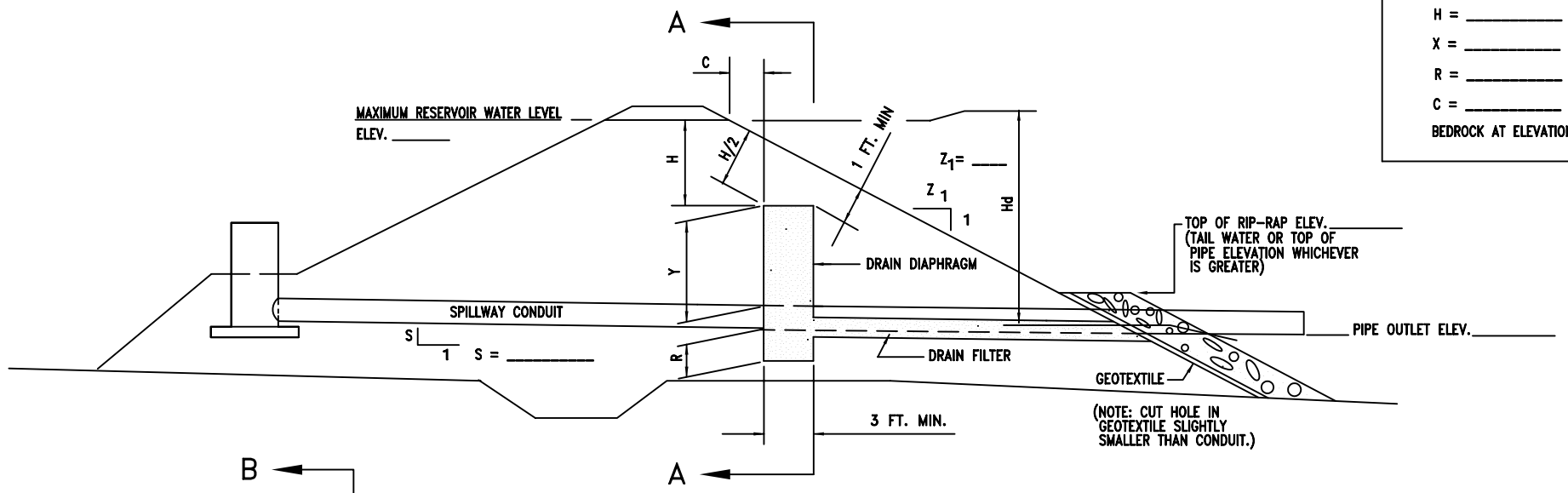
922 = 320	÷ 100 =	32 sq in	x 1600 sqft/IN / 43560 sqft		0.12 AC
924 = 664	÷ 100 =	6.64	x 1600 =		0.24 AC
926 = 1026	÷ 100 =	10.26	x 1600 =		0.36
928 = 1277	÷ 100 =	12.77	x 1600 =		0.47
930 = 1792	÷ 100 =	17.92	x 1600 =		0.66
931 = 2036	÷ 100 =	20.36	x 1600 =		0.75
932 = 2369	÷ 100 =	23.69	x 1600 =		0.87
933 = 2674	÷ 100 =	26.74	x 1600 =		0.98
934 = 3016	÷ 100 =	30.16	x 1600 =		1.1

SUMMARY OF DESIGN

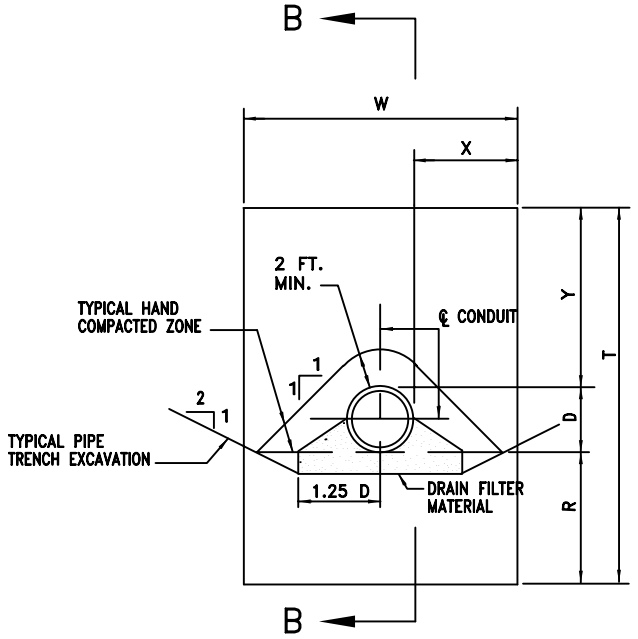
H = _____ FEET
X = _____ FEET
R = _____ FEET
C = _____ FEET
BEDROCK AT ELEVATION _____
Hd = _____ FEET
D = _____ FEET
Y = _____ FEET

SUMMARY OF DIMENSIONS

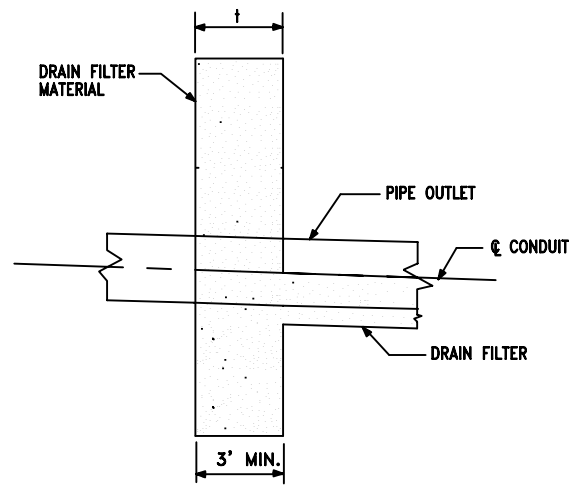
W = _____ FEET TOTAL WIDTH OF DRAIN DIAPHRAGM
T = _____ FEET TOTAL HEIGHT OF DRAIN DIAPHRAGM
t = _____ FEET THICKNESS OF FILTER



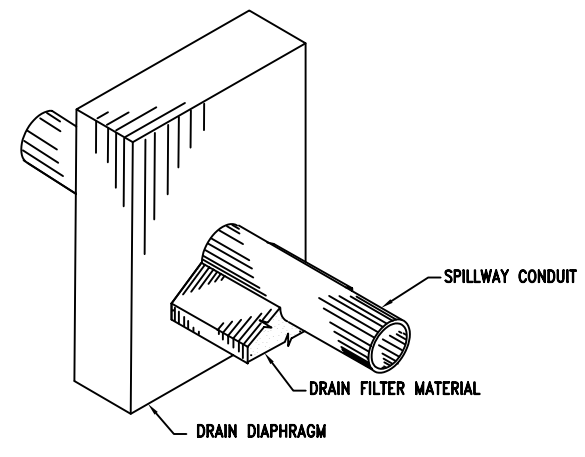
PROFILE ALONG ℄ OF CONDUIT



SECTION A–A



SECTION B–B



PARTIAL ISOMETRIC

SHOWING CONDUIT, DRAIN DIAPHRAGM, & DRAIN FILTER MATERIAL

ESTIMATED QUANTITIES

DRAIN FILTER MATERIAL _____ CUBIC YARDS
GEOTEXTILE _____ SQUARE FEET
RIP-RAP _____ CUBIC YARDS

MATERIAL NOTE

THE GEOTEXTILE SHALL CONFORM TO THE CLASS I REQUIREMENTS IN TABLE 1 (WOVEN) OR TABLE 2 (NONWOVEN) MATERIAL SPECIFICATION 592, EXCEPT THE POA OF THE WOVEN SHALL BE GREATER THAN 6%, AND THE POROSITY OF THE NONWOVEN SHALL BE GREATER THAN 30%.

DRAIN FILTER GRADATION

SIEVE SIZE	PERCENT PASSING
3/8	100
4	95–100
16	45–100
50	5–30
100	0–10

ASTM, C-33 FINE AGGREGATE
MNDOT 3126 FINE AGG
MNDOT 3127 FA-1

RIPRAP GRADATION

PERCENT SMALLER	WEIGHT RANGE (LBS.)	SIZE RANGE (IN.)

MIN. GRADATION
MNDOT CLASS II

DEFINITIONS:

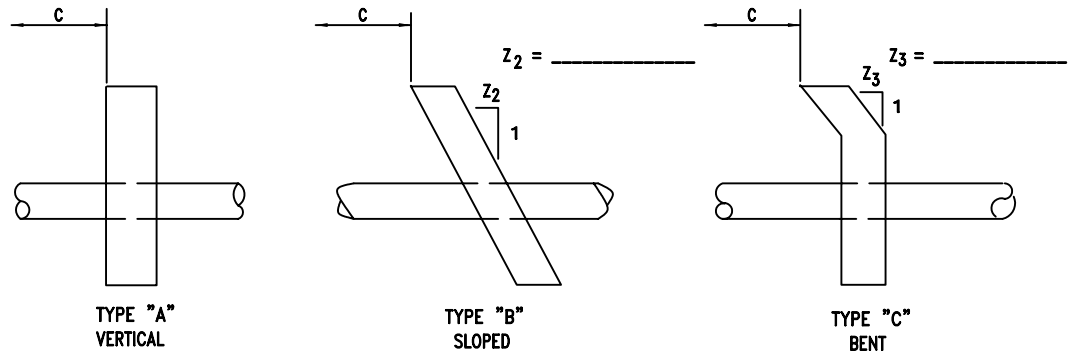
D = OUTSIDE DIAMETER OF CIRCULAR CONDUIT
H = VERTICAL DISTANCE BETWEEN THE TOP OF THE DIAPHRAGM AND THE MAXIMUM POTENTIAL RESERVOIR WATER LEVEL.
X = FOR FLEXIBLE CONDUITS USE THE SMALLER OF 2D OR 5 FEET BEYOND ANY EXCAVATION MADE TO INSTALL THE CONDUIT. FOR RIGID CONDUIT (CONCRETE) USE THE SMALLER OF 3D OR 5 FEET BEYOND ANY EXCAVATION MADE TO INSTALL THE CONDUIT.
Y = VERTICAL DISTANCE FROM TOP OF CONDUIT TO TOP OF DIAPHRAGM
Y = 2D or no higher than maximum potential reservoir water level
C = HORIZONTAL DISTANCE FROM D.S. FACE AT MAXIMUM POTENTIAL RESERVOIR WATER LEVEL TO U.S. FACE OF DIAPHRAGM
R = 2D OR NOT TO EXTEND BEYOND A BEDROCK SURFACE
Hd = VERTICAL DISTANCE FROM MAXIMUM POTENTIAL RESERVOIR WATER LEVEL TO CONDUIT INVERT AT D.S. FACE OF SLOPE
S = SLOPE OF CONDUIT IN FEET OF FALL PER HORIZONTAL FOOT

$$C = Hd * Z_1 - \frac{((1.5 * D) + (Hd / 2))}{(1 / Z) - (S / 2)} > 0 \quad \text{(MAXIMUM)}$$

CONSTRUCTION NOTES:

1. NO COMPACTION OF THE DRAIN FILTER MATERIAL IS REQUIRED BEYOND THAT RESULTING FROM THE PLACING & SPREADING OPERATIONS. THE DRAIN FILTER MATERIAL SHALL BE PLACED IN 12 INCH LIFTS. EACH LIFT SHALL BE SATURATED UNIFORMLY WITH APPROXIMATELY 1.2 GALLONS OF WATER PER CUBIC FOOT OF LOOSE DRAIN MATERIAL.

2. THE MAXIMUM HEIGHT OF DROP OF THE RIPRAP ONTO THE GEOTEXTILE SHALL BE 3 FEET.

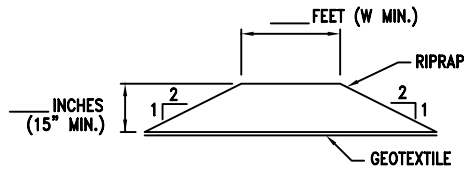


TYPE "A" VERTICAL
TYPE "B" SLOPED
TYPE "C" BENT

DRAIN DIAPHRAGM CONFIGURATIONS

MINNESOTA STANDARD DRAWING

REVISED 12-6-87 DEFINITIONS (RCG)



SECTION OF RIPRAP

PERPENDICULAR TO SLOPE

REVISIONS		
DATE		TITLE

Date
Designed
Drawn CADD (RCG) (3-89)
Checked (MAP) (JAA) (1-94)
Approved

DRAIN DIAPHRAGM
LAYOUT FOR
DROP-INLET WITH DRAIN FILTER

USDA NRCS Natural Resources Conservation Service

File No.
MN301a.DWG

Drawing No.
MN-ENG-310a
5/02

Sheet of

TRI-LAKES FINAL REPORT
HENNY PROPERTY PROJECT
WHITLEY COUNTY, INDIANA

APPENDIX B

AS-BUILT DESIGN PLANS

As-Built edits added November 6, 2007

JFNew
http://www.jfnew.com

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Walkerton, Indiana 46574
574-586-3400 fax 574-586-3446

Indianapolis Office
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Indianapolis, Indiana 46254
317-388-1982 fax 317-388-1986

Ohio Office
8080 Beckett Center Dr., Suite 226
West Chester, Ohio 45069
513-942-3446 fax 513-942-3447

Michigan Office
600 South Beacon
Grand Haven, Michigan 49417
616-847-1680 fax 616-847-9970

Illinois Office
1378 Main Street
Crete, Illinois 60417
708-367-1130 fax 708-367-1132

Wisconsin Office
1402 Pankratz Street, Suite 302
Madison, Wisconsin 53704
608-240-1453

TRI-LAKES

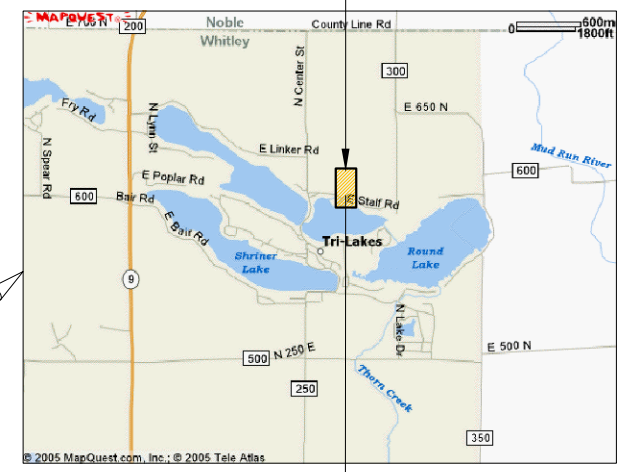
WHITLEY COUNTY INDIANA

LAKE AND RIVER ENHANCEMENT PROJECT

OCTOBER 2005

SHEET INDEX

VICINITY MAP



PROJECT AREA SHOWING DAM LOCATIONS, ROCK CHUTE LOCATIONS, AND CHECK DAM LOCATIONS

Our mission is to provide the highest quality environmental services to our clients while positively impacting the lives of our employees and the conservation of natural resources through prosperity and stewardship.

REVISION

Lake and River Enhancement Project
Tri-Lakes
Cover Sheet

DRAWN BY:	JFH
DESIGNED:	WS, JR, ALB
DATE:	OCT 2005
JOB NO:	030123

DRAWING NO.

1

OF 3

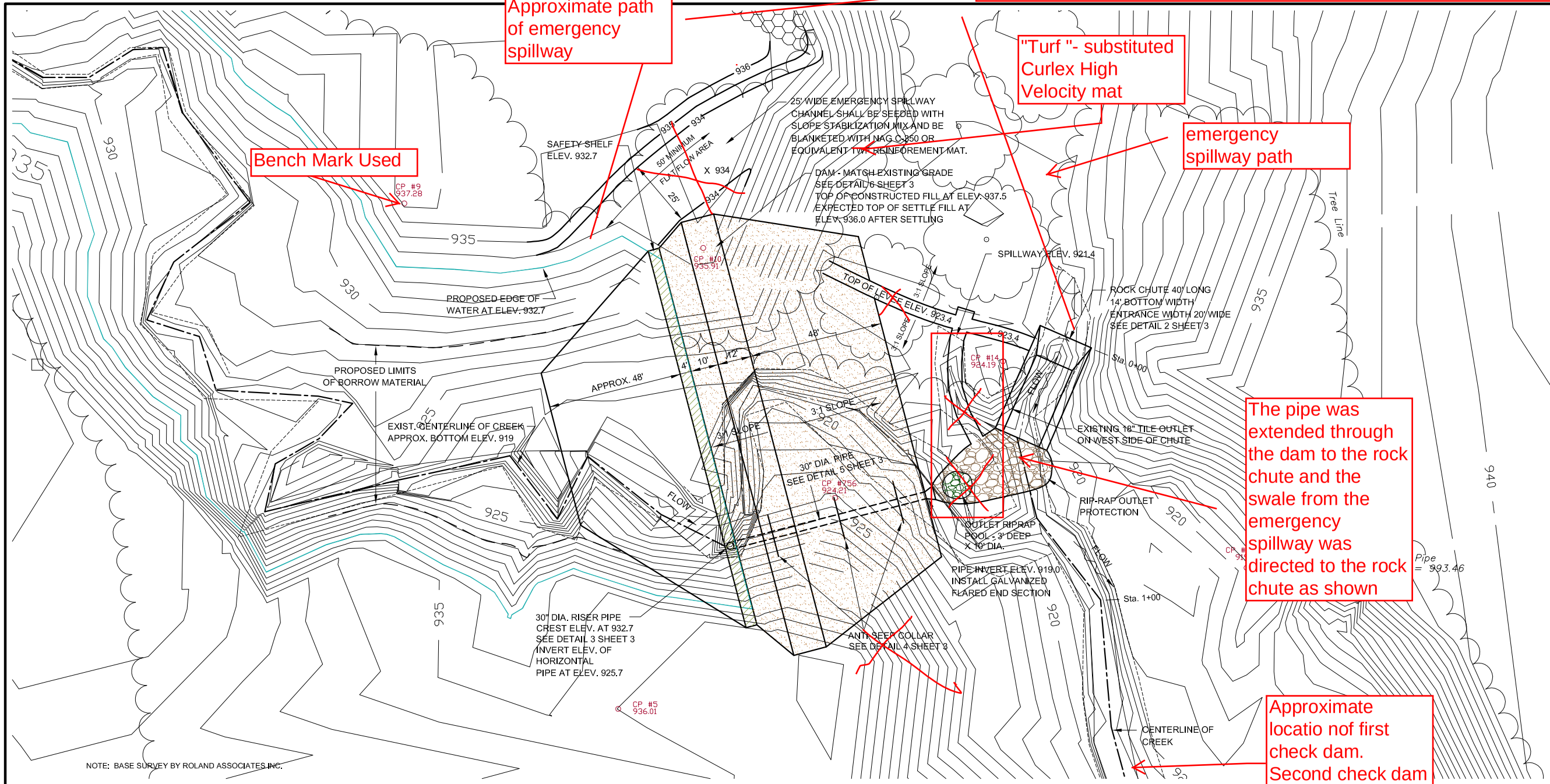
AS -BUILT CONSTRUCTION EDITS ADDED NOVEMBER 6,2007

Approximate path of emergency spillway

"Turf "- substituted Curlex High Velocity mat

emergency spillway path

Bench Mark Used



The pipe was extended through the dam to the rock chute and the swale from the emergency spillway was directed to the rock chute as shown

Approximate locatio nof first check dam. Second check dam located 200 feet downstream

NOTE: BASE SURVEY BY ROLAND ASSOCIATES INC.

Emergent Wetland Seed Mix

Botanical Name	Common Name	PLS Ounces/Acre
Permanent Grasses/ Sedges/Rushes:		
Carex comosa	Bristly Sedge	2.00
Carex lacustris	Common lake sedge	1.50
Carex lurida	Bottlebrush Sedge	4.00
Eleocharis obtusa	Spike Rush	3.00
Juncus effusus	Common Rush	4.00
Leersia orzyoides	Rice Cut Grass	3.00
Scirpus acutus	Hard-stemmed bulrush	6.00
Scirpus pungens	Chairmakers rush	6.00
Scirpus validus	Great bulrush (Softstem)	8.00
		37.50
Temporary Cover:		
Agrostis alba	Redtop	4.00
Avena sativa	Seed oats	360.00
Lolium multiflorum	Annual rye	100.00
		464.00

Botanical Name	Common Name	PLS Ounces/Acre
Forbs:		
Acorus calamus	Sweet Flag	4.00
Asclepias incarnata	Swamp Milkweed	2.00
Alisma spp.	Water Plantain	4.00
Eupatorium maculatum	Spotted Joe Pye Weed	0.50
Hibiscus spp.	Rosemallow, various	2.00
Iris virginica shrevei	Blue Flag Iris	4.00
Lobelia cardinalis	Cardinal flower	0.75
Lobelia siphilitica	Great blue lobelia	0.75
Ludwigia alternifolia	Seedbox	0.50
Mimulus ringens	Monkey Flower	1.00
Peltandra virginica	Arrow Arum	12.00
Pontederia cordata	Pickerel Weed	8.00
Sagittaria latifolia	Broad-Leaf Arrowhead	8.00
Sparganium eurycarpum	Bur Reed	4.00
Verbena hastata	Blue Vervain	2.00
Zizania aquatica	Wild rice	12.00
		65.50

Slope Stabilization Seed Mix

Botanical Name	Common Name	PLS Ounces/Acre
Permanent Grasses:		
Andropogon gerardii	Big bluestem grass	20.00
Andropogon scoparius	Little bluestem grass	32.00
Bouteloua curtipendula	Side-oats grama	5.00
Elymus canadensis	Canada wild rye	18.00
Panicum virgatum	Switch grass	16.00
Sorghastrum nutans	Indian grass	24.00
		115.00
Temporary Cover:		
Agrostis alba	Redtop	16.00
Avena sativa	Seed oats	512.00
Lolium multiflorum	Annual rye	160.00
Phleum pratense	Timothy	64.00
		752.00

NO

Construction Sequence is as Follows:

1) Clear dam footprint and area of rock chute of all trees, shrubs, roots and other herbaceous material.
2) Construct cutoff trench 2-foot deep into good soil material and 8-foot wide along the centerline of the proposed dam beginning at the top of the north slope to the bottom, across the valley, and up to the top of the south slope.
3) Dam shall be constructed in soil lifts at no more than 6-inches in depth and each lift compacted to 95% proctor.
4) Finish slopes of dam for seeding.
5) Construct outfall protection, rock chute and emergency spillway.

N
0 20'
SCALE IN FEET

JFNew
Corporate Office
708 Roosevelt Road
Walkerton, Indiana 46574
574-586-3400

Indianapolis Office
6640 Parkdale Place, Suite S
Indianapolis, Indiana 46254
317-388-1982

REVISION

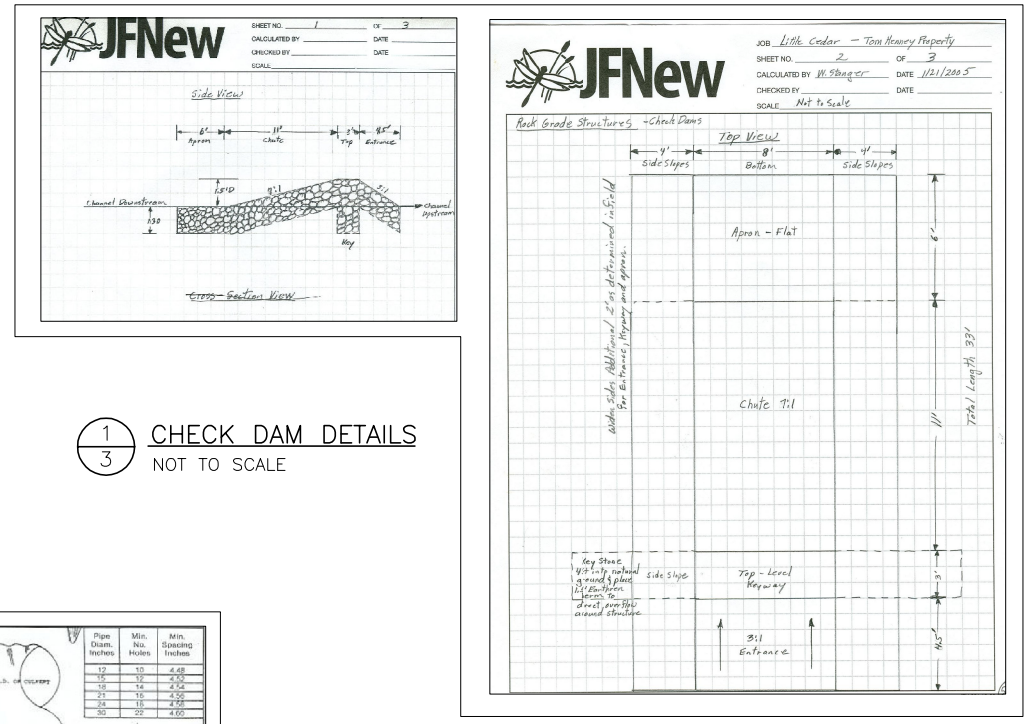
Lake and River Enhancement Project
Tri-Lakes
Site Plan and Planting List

DRAWN BY:	JFH
DESIGNED:	WS, JR, ALB
DATE:	OCT 2005
JOB NO:	030123

DRAWING NO.

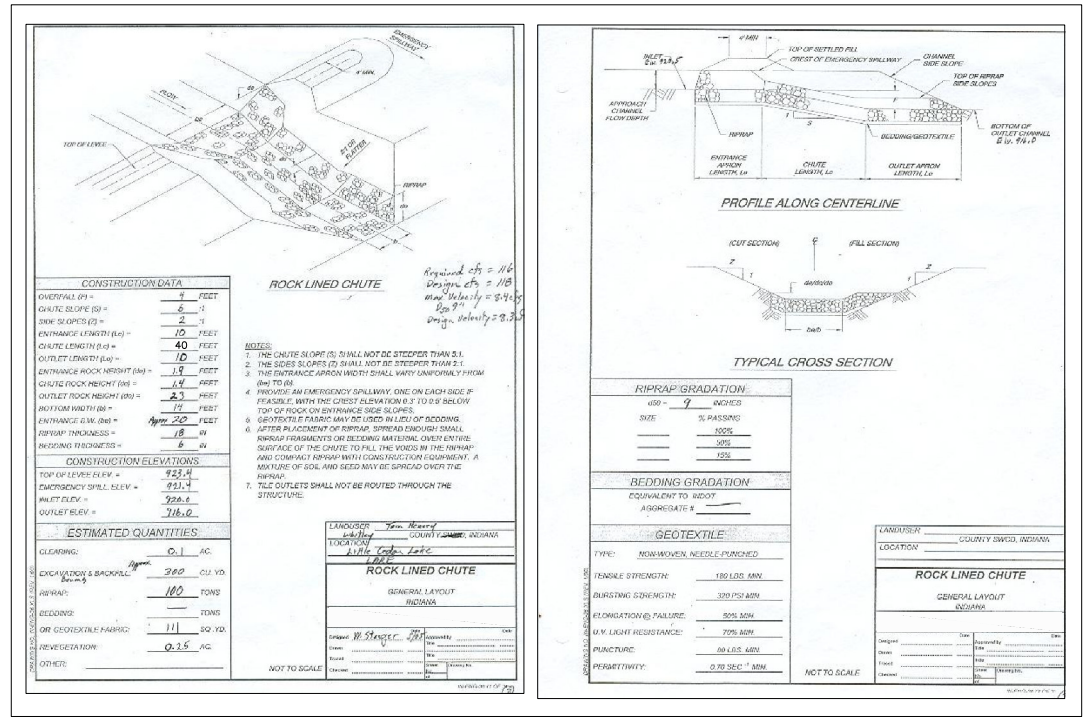
2

OF 3

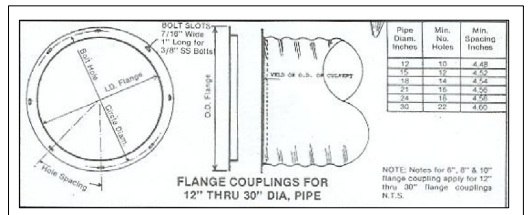


1/3 CHECK DAM DETAILS
NOT TO SCALE

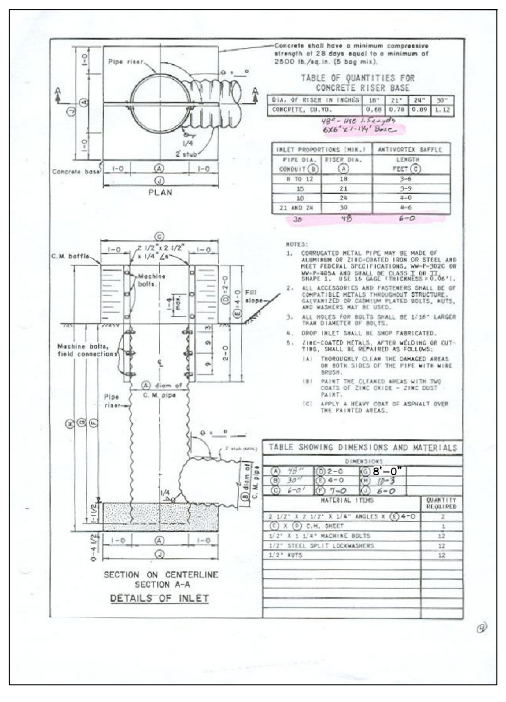
PLAN VIEW



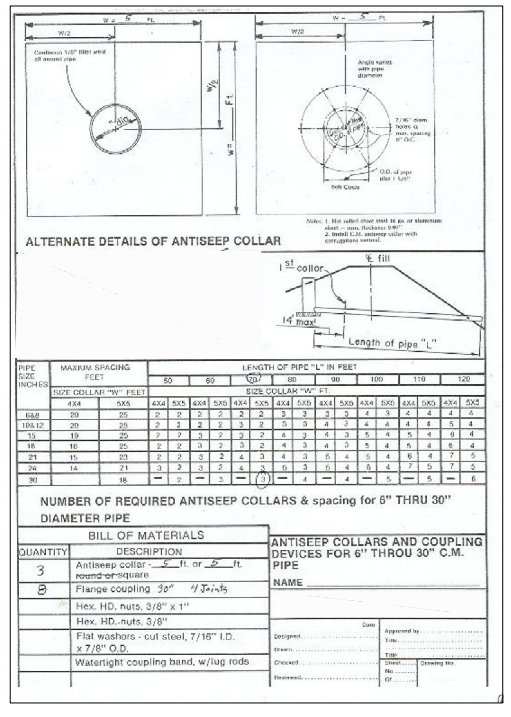
2/3 ROCK CHUTE DETAILS
NOT TO SCALE



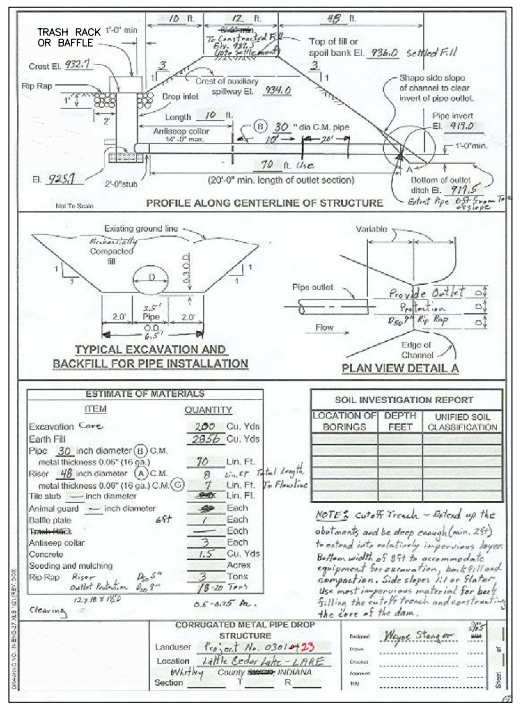
RISER PIPE FLANGE COUPLING DETAIL



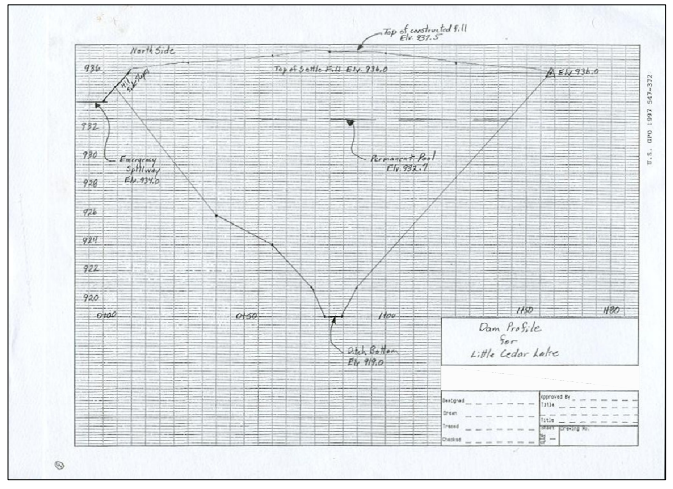
3/3 RISER PIPE DETAIL
NOT TO SCALE



4/3 ANTI-SEEP COLLAR DETAIL
NOT TO SCALE



5/3 DAM OUTLET PIPE DETAIL
NOT TO SCALE



6/3 DAM PROFILE
NOT TO SCALE

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574-586-3400

Indianapolis Office
6640 Parkdale Place, Suite S
Indianapolis, Indiana 46254
317-388-1982

REVISION

Lake and River Enhancement Project
Tri-Lakes
Details

DRAWN BY:	JFH
DESIGNED:	WS, JR, ALB
DATE:	OCT 2005
JOB NO:	030123

DRAWING NO.

3

OF 3

TRI-LAKES FINAL REPORT
HENNY PROPERTY PROJECT
WHITLEY COUNTY, INDIANA

APPENDIX C

CONSTRUCTION DOCUMENTATION AND PHOTOGRAPHS

MIT, INC.

MATERIALS INSPECTION TESTING, INC.
3807 GOSHEN ROAD
FORT WAYNE, INDIANA 46818
260-489-1567

SOIL COMPACTION REPORT

MIT JOB #:	2007-100/WE
PROJECT:	TRI LAKES
CLIENT:	WILCOXSON & SON EXCAVATING
CLIENT JOB #:	
DATE:	8/13/2007
TECHNICIAN:	A. GRIMM
CONTRACTOR:	WILCOXSON & SON EXCAVATING
TYPE OF FILL:	BROWN CLAY
COMPACTION EQUIPMENT:	SHEEPSFOOT
AREA WORKED:	DIKE

STD. (ASTM D-625) OR MOD. (ASTM D-1557):	MODIFIED
MAX. DENSITY (#/C.F.)	127.5
OPTIMUM MOISTURE (%)	10.6
REQUIRED DENSITY (%):	95.0%
TEST METHOD:	NUCLEAR

TEST DATA

TEST #	TEST LOCATION	DEPTH BELOW GRADE +/-	PERCENT MOISTURE	PERCENT COMPACTION
1	DIKE CORE WEST END	18.0'+/-	12.7	96.9
2	DIKE CORE CENTER	18.0'+/-	12.4	97.4
3	DIKE CORE EAST END	18.0'+/-	11.6	97.6
4	DIKE CORE WEST END	17.5'+/-	12.3	97.6
5	DIKE CORE CENTER	17.5+/-	13.2	97.1
6	DIKE CORE EAST END	17.5'+/-	12.7	96.9
7	DIKE CORE WEST END	17.0'+/-	12.9	96.8
8	DIKE CORE CENTER	17.0'+/-	13.2	96.2
9	DIKE CORE EAST END	17.0'+/-	13.0	96.6
10	DIKE CORE WEST END	16.0'+/-	11.6	97.5
11	DIKE CORE CENTER	16.0'+/-	12.7	98.3
12	DIKE CORE EAST END	16.0'+/-	12.4	96.4
13	DIKE CORE WEST END	15.0'+/-	11.1	99.7
14	DIKE CORE CENTER	15.0'+/-	11.5	96.6
15	DIKE CORE EAST END	15.0'+/-	12.5	95.9
16	DIKE CORE WEST END	14.0'+/-	10.7	95.9
17	DIKE CORE CENTER	14.0'+/-	9.9	98.1
18	DIKE CORE EAST END	14.0'+/-	11.9	98.3
19				
20				

REMARKS:

Nuclear density tests reflect percent compaction at test elevation only and, do not, reflect per cent compaction of underlying soils .

MIT, INC.

MATERIALS INSPECTION TESTING, INC
3807 GOSHEN ROAD
FORT WAYNE, INDIANA 46818
260-489-1567

SOIL COMPACTION REPORT

MIT JOB #:	2007-100/WE
PROJECT:	TRI LAKES
CLIENT:	WILCOXSON & SON EXCAVATING
CLIENT JOB #:	
DATE:	8/14/2007
TECHNICIAN:	A. GRIMM
CONTRACTOR:	WILCOXSON & SON EXCAVATING
TYPE OF FILL:	BROWN CLAY
COMPACTION EQUIPMENT:	SHEEPSFOOT
AREA WORKED:	DIKE CORE

STD. (ASTM D-625) OR MOD. (ASTM D-1557):	MODIFIED
MAX. DENSITY (#/C.F.)	127.5
OPTIMUM MOISTURE (%)	10.6
REQUIRED DENSITY (%):	95.0%
TEST METHOD:	NUCLEAR

TEST DATA

TEST #	TEST LOCATION	DEPTH BELOW GRADE +/-	PERCENT MOISTURE	PERCENT COMPACTION
1	DIKE CORE WEST END	12.0'+/-	13.8	96.7
2	DIKE CORE CENTER	12.0'+/-	14.7	95.8
3	DIKE CORE EAST END	12.0'+/-	13.4	96.9
4	DIKE CORE WEST END	11.0'+/-	14.3	95.8
5	DIKE CORE CENTER	11.0'+/-	14.1	95.5
6	DIKE CORE EAST END	11.0'+/-	13.9	95.7
7				
8				
9				
10				
11				
12				
13				
14				
15				
16				
17				
18				
19				
20				

REMARKS:

REMAINING FILL PLACED THIS DATE WAS WELL ABOVE OPTIMUM MOISTURE.
IT WAS RECOMMENDED TO SCARIFY AND ALLOW FILL MATERIAL TO DRY.
Nuclear density tests reflect percent compaction at test elevation only and, do not, reflect
per cent compaction of underlying soils .

MIT, INC.

MATERIALS INSPECTION TESTING, INC.
3807 GOSHEN ROAD
FORT WAYNE, INDIANA 46818
260-489-1567

SOIL COMPACTION REPORT

MIT JOB #:	2007-100/WE
PROJECT:	TRI LAKES
CLIENT:	WILCOXSON & SON EXCAVATING
CLIENT JOB #:	
DATE:	8/15/2007
TECHNICIAN:	A. GRIMM
CONTRACTOR:	WILCOXSON & SON EXCAVATING
TYPE OF FILL:	GRAY CLAY
COMPACTION EQUIPMENT:	SHEEPSFOOT
AREA WORKED:	DIKE CORE

STD. (ASTM D-625) OR MOD. (ASTM D-1557):	MODIFIED
MAX. DENSITY (#/C.F.)	133.2
OPTIMUM MOISTURE (%)	9.2
REQUIRED DENSITY (%):	95.0%
TEST METHOD:	NUCLEAR

TEST DATA

TEST #	TEST LOCATION	DEPTH BELOW GRADE +/-	PERCENT MOISTURE	PERCENT COMPACTION
1	DIKE CORE WEST END	10.0'+/-	11.4	96.3
2	DIKE CORE CENTER	10.0'+/-	11.7	95.5
3	DIKE CORE EAST END	10.0'+/-	11.6	95.6
4	DIKE CORE WEST END	9.0'+/-	14.3	91.7
5	DIKE CORE CENTER	9.0'+/-	14.1	92.1
6	DIKE CORE EAST END	9.0'+/-	13.9	92.3
7				
8				
9				
10				
11				
12				
13				
14				
15				
16				
17				
18				
19				
20				

REMARKS:

REMAINING FILL PLACED THIS DATE WAS WELL ABOVE OPTIMUM MOISTURE.
IT WAS RECOMMENDED TO SCARIFY AND ALLOW FILL MATERIAL TO DRY.

Nuclear density tests reflect percent compaction at test elevation only and, do not, reflect per cent compaction of underlying soils .

MATERIALS INSPECTION & TESTING, INC.
3807 GOSHEN ROAD
FORT WAYNE, INDIANA 46818
PHONE: 260-489-1567
FAX: 260-489-1993

FIELD ENGINEERS DAILY REPORT

MIT JOB #: 2007-100/TE
PROJECT: TRI LAKES
CLIENT: WILCOXSON & SON EXCAVATING
CLIENT JOB #:
DATE: 8/18/07

TYPE OF INSPECTION PERFORMED

COMPACTION:

Housel and/or Hand Penetrometer tests are conducted for all foundation inspections.
Tests are first conducted at design footing elevation. If results and soil conditions are unsuitable and over excavation is required, additional tests are then conducted at the acceptable bottom of footing elevation. A soil "T" probe is randomly used as an aid in detection of soft or yielding soils. Probe penetration is not reported unless considered significant.
Note: Housel Penetrometer and Hand Penetrometer tests are an indication of allowable soil bearing capacity at test elevation only. Underlying unexposed soil conditions could have an affect on the ultimate bearing capacity of any soil.

BRIEF RESUME OF INSPECTION THIS DATE

M.I.T., INC. was present on site this date for the following:

Compaction tests were conducted on engineered fill at +/-6.5' below finish grade. Density tests taken did not meet the specified 95% compaction. It was recommended these soils be scarified and allowed to dry. Moisture content of soils ranged from 10.2% to as high as 14.8%. Additional tests to be performed at a later date.

SIGNED K. SCOTT

MIT, INC.

MATERIALS INSPECTION TESTING, INC.
3807 GOSHEN ROAD
FORT WAYNE, INDIANA 46818
260-489-1567

SOIL COMPACTION REPORT

MIT JOB #:	2007-100/WE
PROJECT:	TRI LAKES DIKE
CLIENT:	WILCOXSON & SON EXCAVATING
CLIENT JOB #:	
DATE:	9/4/2007
TECHNICIAN:	A. GRIMM
CONTRACTOR:	WILCOXSON & SON EXCAVATING
TYPE OF FILL:	GRAY CLAY; TRACES OF GRAVEL
COMPACTION EQUIPMENT:	SHEEPSFOOT
AREA WORKED:	DIKE CORE

STD. (ASTM D-625) OR MOD. (ASTM D-1557):	MODIFIED
MAX. DENSITY (#/C.F.)	133.2
OPTIMUM MOISTURE (%)	9.2
REQUIRED DENSITY (%):	95.0%
TEST METHOD:	NUCLEAR

TEST DATA				
TEST #	TEST LOCATION	DEPTH BELOW GRADE +/-	PERCENT MOISTURE	PERCENT COMPACTION
1	EAST SIDE OF DIKE	8.5'+/-	8.4	97.3
2	CENTER OF DIKE	8.5'+/-	7.2	97.0
3	WEST END OF DIKE	8.5'+/-	7.6	96.7
4	EAST END OF DIKE	7.5'+/-	8.1	96.2
5	CENTER OF DIKE	7.5'+/-	7.3	96.8
6	WEST END OF DIKE	7.5'+/-	7.9	97.5
7	EAST END OF DIKE	6.5'+/-	7.8	96.7
8	CENTER OF DIKE	6.5'+/-	8.5	96.3
9	WEST END OF DIKE	6.5'+/-	8.2	96.0
10	EAST END OF DIKE	5.5'+/-	8.6	97.3
11	CENTER OF DIKE	5.5'+/-	8.2	96.4
12	WEST END OF DIKE	5.5'+/-	8.4	96.1
13	EAST END OF DIKE	4.5'+/-	9.1	98.1
14	CENTER OF DIKE	4.5'+/-	9.5	97.9
15	WEST END OF DIKE	4.5'+/-	8.5	99.0
16				
17				
18				
19				
20				

REMARKS:

Nuclear density tests reflect percent compaction at test elevation only and, do not, reflect per cent compaction of underlying soils .

MIT, INC.

MATERIALS INSPECTION TESTING, INC.
3807 GOSHEN ROAD
FORT WAYNE, INDIANA 46818
260-489-1567

SOIL COMPACTION REPORT

MIT JOB #:	2007-100/WE
PROJECT:	TRI LAKES DIKE
CLIENT:	WILCOXSON & SON EXCAVATING
CLIENT JOB #:	
DATE:	9/5/2007
TECHNICIAN:	A. GRIMM
CONTRACTOR:	WILCOXSON & SON EXCAVATING
TYPE OF FILL:	GRAY CLAY; TRACES OF GRAVEL
COMPACTION EQUIPMENT:	SHEEPSFOOT
AREA WORKED:	DIKE CORE

STD. (ASTM D-625) OR MOD. (ASTM D-1557):	MODIFIED
MAX. DENSITY (#/C.F.)	133.2
OPTIMUM MOISTURE (%)	9.2
REQUIRED DENSITY (%):	95.0%
TEST METHOD:	NUCLEAR

TEST DATA				
TEST #	TEST LOCATION	DEPTH BELOW GRADE +/-	PERCENT MOISTURE	PERCENT COMPACTION
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2	CENTER OF DIKE	4.0'+/-	8.8	99.9
3	WEST END OF DIKE	4.0'+/-	8.5	99.3
4	EAST END OF DIKE	3.0'+/-	9.6	96.9
5	CENTER OF DIKE	3.0'+/-	9.9	96.3
6	WEST END OF DIKE	3.0'+/-	9.8	96.6
7	EAST END OF DIKE	2.0'+/-	8.6	97.9
8	CENTER OF DIKE	2.0'+/-	9.2	97.0
9	WEST END OF DIKE	2.0'+/-	9.0	96.8
10	EAST END OF DIKE	1.5'+/-	9.5	99.1
11	CENTER OF DIKE	1.5'+/-	9.9	96.3
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REMARKS:

Nuclear density tests reflect percent compaction at test elevation only and, do not, reflect per cent compaction of underlying soils .

M I T
INCORPORATED

MATERIALS INSPECTION & TESTING, INC.

PHONE (260) 489-1567 - 3807 GOSHEN ROAD - FORT WAYNE, INDIANA 46818

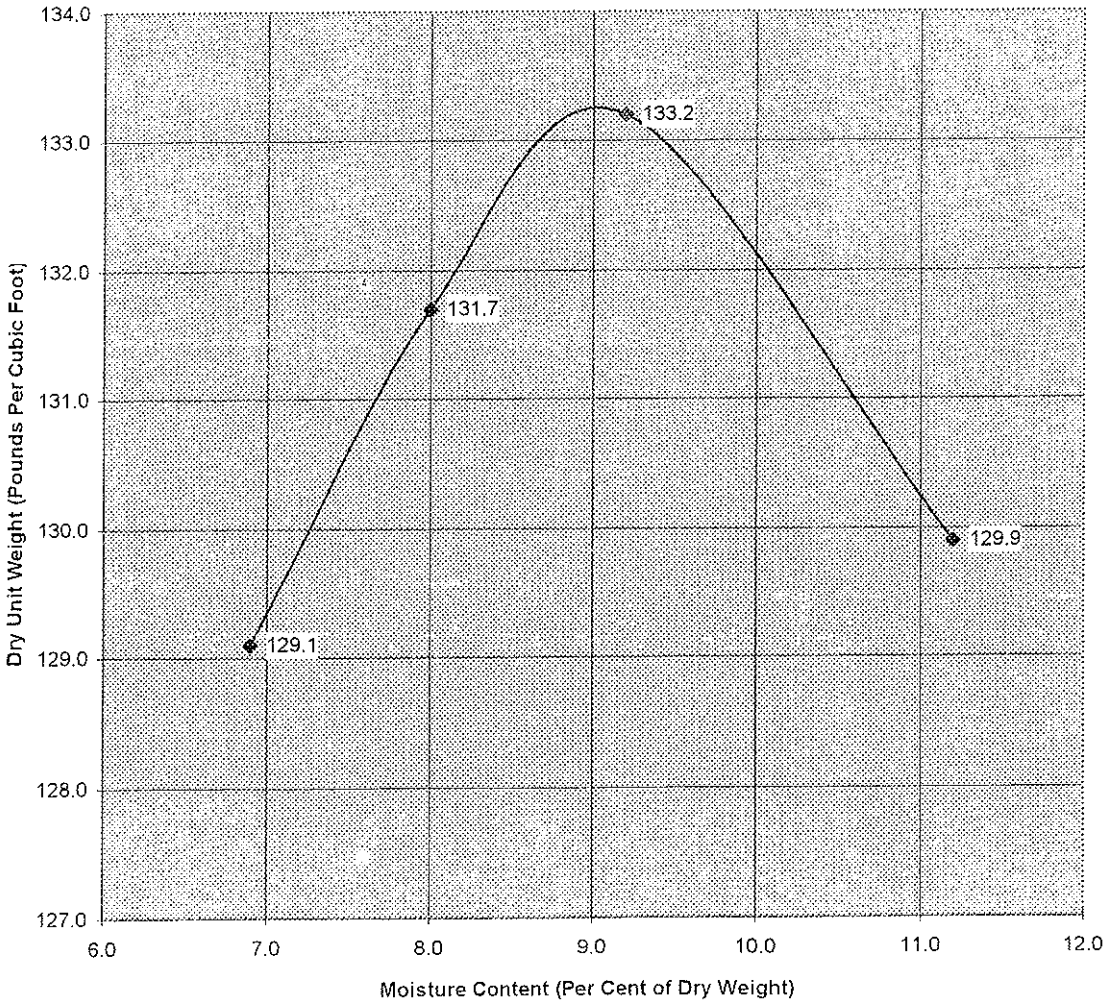
MIT JOB# 2007-100/WE
PROJECT TRI LAKES DIKE
CLIENT WILCOXSON & SON EXC.
CLIENT JOB#
DATE 8/14/2007

Proctor Test - Moisture Density Relationship

PROJECT	Sample #	Modified
TRI LAKES DIKE	1	ASTM D-1557
LOCATION		
TRI LAKES, INDIANA		
TYPE OF SOIL		
GRAY SILTY CLAY TRACES OF GRAVEL		

RESULTS	
MAXIMUM DENSITY	133.2
OPTIMUM MOSITURE	9.2

Proctor Test Graph



TESTED BY:	PLOTTED BY:	CHECKED BY:
AG	AG	TR

M I T
INCORPORATED

MATERIALS INSPECTION
& TESTING, INC.

PHONE (260) 489-1567 - 3807 GOSHEN ROAD - FORT WAYNE, INDIANA 46818

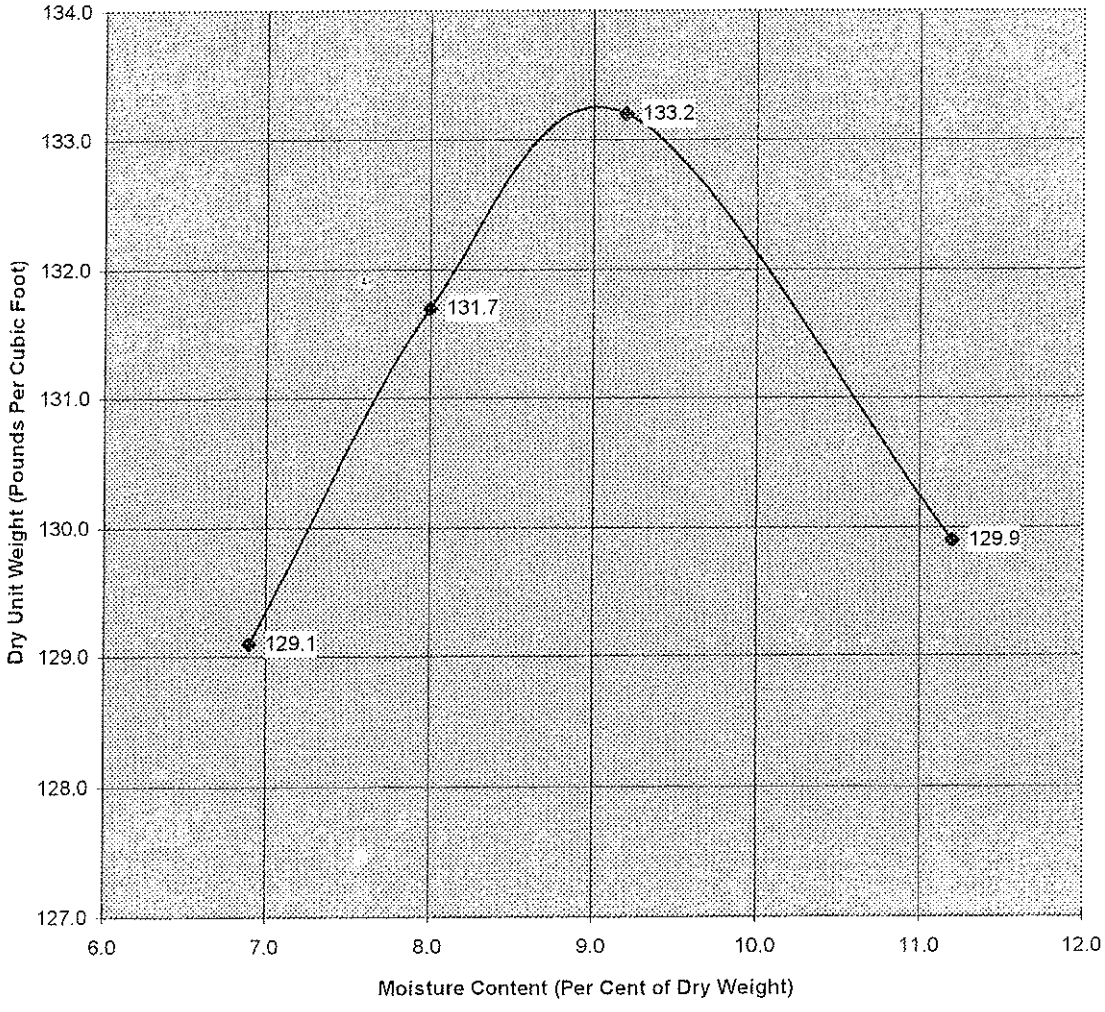
MIT JOB# 2007-100/WE
PROJECT TRI LAKES DIKE
CLIENT WILCOXSON & SON EXC.
CLIENT JOB#
DATE 8/14/2007

Proctor Test - Moisture Density Relationship

PROJECT	Sample #	Modified
TRI LAKES DIKE	1	ASTM D-1557
LOCATION		
TRI LAKES, INDIANA		
TYPE OF SOIL		
GRAY SILTY CLAY TRACES OF GRAVEL		

RESULTS	
MAXIMUM DENSITY	133.2
OPTIMUM MOSITURE	9.2

Proctor Test Graph



TESTED BY:	PLOTTED BY:	CHECKED BY:
AG	AG	TR

Photos of the Project During Construction

TRI-LAKES FINAL REPORT
HENNY PROPERTY PROJECT
WHITLEY COUNTY, INDIANA

APPENDIX D

REGIONAL GENERAL PERMIT APPLICATION

US Army Corps of Engineers Section 404

Indiana Department of Environmental Management Section 401

708 Roosevelt Road
Walkerton, Indiana 46574
Phone: 574-586-3400 ext. 307
Fax: 574-586-3446

John B. Richardson
Senior Project Manager
email: jrichardson@jfnew.com

June 15, 2007

Sara Slater-Atwater
Section 401 Program
IDEM- Office of Water Quality
PO Box 6015
Indianapolis, IN 46206-6015

RE: Regional General Permit Notification
Tom Henny Ravine Stabilization
Tri-Lakes Property Owners Association, Whitley Country, Indiana

Dear Sara:

Please find enclosed the 401 RGP notification form, project plans, and photographs of the project area. The Tri-Lakes Property Owners Association (Association) is undertaking a project to reduce sediments t Cedar Lake from a severely eroding drainage. The property is owned by Thomas and Julie Henny. The Association has applied for and received a construction grant from the Lake and River Enhancement Program for this project. JFNew has been contracted to supervise the construction of the project.

Construction is proposed for August 2007. Please contact me directly if you need additional project details or photographs or you wish to visit the site.

Sincerely,

John B. Richardson

Encl: 401 Regional Permit Notification, plans, photographs

Cc: Tim Smith – ACOE
JFNew File 03-01-23

Section 401 WQC Regional General Permit Notification

State Form 51937 (10-04)
Indiana Department of Environmental Management

INSTRUCTIONS: *1. Read the instruction sheet before filling out this form.*
2. All sections of this two page form must be complete.

FOR IDEM USE ONLY	***Date Rec'd:***	***IDEM ID:***

Applicant Information

Applicant:	Agent:
Tri_Lakes Property Owners Association	JFNew and Associates, Inc.
Contact person: Todd Nichols	Contact person: John Richardson
Address: PO Box 821 Columbia City, IN 46725	Address: 708 Roosevelt Road Walkerton, IN 56574
Phone: (260) 691-9992	Phone: 574-586-3400
E-mail:	E-mail: jrichardson@jfnew.com

Project Location

County:		Nearest Town:	
Whitley		Columbia City	
Quad Name: Merriam	Township: 32 North	Range: 9 E	Section: 1

Project Address:
2400 North 250 East Just north of Little Cedar Lake on Tom Henny Farm

Existing Conditions

Wetlands: ☐ YES X NO (Not in affected area of project)	Total acreage onsite: N/A
Wetland type: ☐ Emergent ☐ Scrub-shrub ☐ Forested N/A	
Stream: **X** YES ☐ NO	Stream name: Unnamed drainage
Open water: X YES	Open water type: Ephemeral to Seasonal Drainage

Project Impacts

Activity Description:
Construct a dam at the bottom of a ravine that will have a base width of approximately 100 feet and a height of 19 feet. Also construct up to five riprap check dams down stream of the dam. Each check dam will have 5-10 cubic yards of riprap. Placed within the channel below the OHWM. The dam will have less than 20 cubic yards placed below the OHWM.

Purpose of project:
To reduce sedimentation to Little Cedar Lake

Acres of wetland impact
0.00 Emergent: 0 Scrub/shrub: 0 Forested: 0

Linear feet of stream impact: 120	Acres of open water impact: less then 0.1 acres

Riprap below the Ordinary High Water Mark
Volume *(cubic yds. per running ft.)*: 0.5 Area *(sq. ft.)*: 200 +/-

Signature of Applicant - Statement of Affirmation

I certify that I am familiar with the information contained in this notification and, to the best of my knowledge and belief, such information is true and accurate. I certify that I have the authority to undertake and will undertake the activities as described in this notification. I am aware that there are penalties for submitting false information. I understand that any changes in project design subsequent to IDEM's granting of authorization to discharge to a water of the state are not authorized and I may be subject to civil and criminal penalties for proceeding without proper authorization. I agree to allow representatives of the IDEM to enter and inspect the project site. I understand that the granting of other permits by local, state, or federal agencies does not release me from the requirement of obtaining the authorization requested herein before commencing the project.

Applicant's Signature: Original Signed _____ **Date:** June 16 2007 (mm/dd/yyyy)

Print Name: Todd Nichols **Title:** Co-Chair Environmental Committee

Enclose copies of the following documents (ALL enclosures must be on 8.5" by 11" paper:

XLocation map
XDrawings of existing site and proposed project
XAt least three photos of site, labeled
N/A Copies of all correspondence from the U.S. Army Corps of Engineers
N/A Copy of wetland delineation report

Mail this form and attachments to:

Indiana Department of Environmental Management
Office of Water Quality
Section 401 WQC/State Isolated Wetlands Program
P.O. Box 6015
Indianapolis, Indiana 46206-6015

Please note:

1. IDEM will review this form and all attachments for completeness and accuracy. You will be contacted within thirty (30) days of the date of receipt of this form **only** if problems are identified. IDEM may require additional information to verify that the project meets all conditions of the Regional General Permit and the Section 401 WQC. If you are not contacted by IDEM within thirty (30) days of the date of receipt of this form by IDEM, your project is thereby authorized, subject to the terms and conditions of the Section 401 Water Quality Certification and its conditions. **You will not receive a written confirmation of authorization.**

2. Read **all** the terms and conditions of this regional general permit, including all U.S. Army Corps of Engineers and Indiana Department of Environmental Management conditions. Do not submit this form or commence work on the proposed project until you understand and are familiar with the limitations and restrictions of this regional general permit.

3. Consult this webpage for more information: http://www.in.gov/idem/water/planbr/401/rgp02.html

Instructions for Completing the Regional General Permit – IDEM Notification Form

Please read these instructions carefully before completing the notification form. Sections labeled as mandatory must be completed accurately and completely in order for IDEM to process this notification. Failure to complete all mandatory sections of the form can result in the rejection of the notification by IDEM.

DO NOT use this form if your project will impact ANY isolated wetlands. Consult with IDEM staff to determine the correct application form for use with your project.

If you have any questions or are unsure if your project qualifies for or requires this authorization, contact IDEM:

Indiana Department of Environmental Management
Office of Water Quality
Section 401 Water Quality Certification/State Isolated Wetlands Program
P.O. Box 6015
Indianapolis, Indiana 46206-6015

Telephone: (317) 233-8488

Print clearly or type.
Attach additional information on 8.5" x 11" sheets only

Block 1 – Applicant Information

1. **MANDATORY:** Provide the applicant's name, address, and telephone number. Applicants MUST provide a contact name, especially in cases where the application is on behalf of a corporation or similar entity.

2. **OPTIONAL:** Provide the agent's address and telephone information (an agent is anyone representing the applicant on the project, such as an attorney or consultant). Applicants are not required to have an agent. This information should be included if a person other than the applicant is submitting the form and that person is designated as the contact point for questions regarding the proposed project.

Block 2 – Project Location

MANDATORY: Complete all blocks within this section. Most information required in this section can be obtained from the United States Geological Survey (USGS) 7.5-Minute Series Topographic Quadrangle maps, or similar computer desktop mapping software. An address or descriptive location must be provided in order to allow for compliance inspection of the project.

Block 3 – Existing Conditions

1. **MANDATORY:** This section provides information on the types of aquatic resources present on the project site PRIOR TO any proposed impacts. Circle all of the appropriate types of waterbodies and clearly denote the size of that waterbody on the project site. If a project site has more than one wetland, add all the acres of each type wetland together to provide a grand total on the form.

2. For wetlands, acreages and types must be confirmed with a jurisdictional wetland delineation conducted in accordance with the 1987 Corps of Engineers Wetland Delineation Manual. Please attach a copy of this delineation or letter of confirmation from the Corps of Engineers for all projects that will impact wetlands. In addition, a letter from the Corps of Engineers confirming that the wetlands in question are regulated under the Clean Water Act must be provided.

Block 4 – Project Impacts

1. **MANDATORY:** Complete all blocks within this section. Attach additional sheets if needed. Activity description refers to WHAT are you doing – filling a wetland, placing riprap, constructing bridge piers, placing a culvert, for example. Project description refers to WHY are you impacting a waterbody – creating a driveway, stabilizing a streambank, developing a site for commercial use, for example.

2. When calculating stream impact, all areas that are affected by placement of fill, bank armoring, culverting, excavation, or any other activity must be counted. Any proposed project involving the creation of dams or in-channel pools CANNOT use this form.

3. When calculating open water impact, all areas within lakes, rivers, streams and the like must be counted. This includes areas under new bridge piers, beaches, and boat ramps, as examples.

4. The Ordinary High Water Mark means that line on the shore of a waterbody established by the fluctuations of water and indicated by physical characteristics such as clear, natural line impressed on the bank, shelving, changes in the character of soil, natural destruction of terrestrial vegetation, the presence of litter and debris, or other appropriate means that consider the characteristics of the surrounding areas.

Signature of Applicant - Statement of Affirmation

MANDATORY: The name and signature must match the name of the applicant on the first page. Notification forms signed by any agent will be returned to the applicant.

NOTE - The listed supplemental information must be provided in order to verify that your project qualifies for the terms and conditions of this regional general permit. Enclose a wetland delineation report for any project that will impact wetlands as a part of the proposed activities.